

# PATENT ABSTRACTS OF JAPAN

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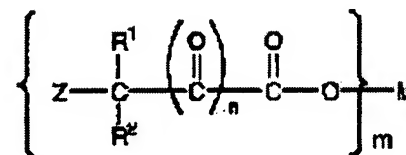
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## (54) HEAT-DEVELOPABLE RECORDING MATERIAL

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To provide a heat-developable recording material high in Dmax and sensitivity, enhanced enough in contrast, small in photographic performance due to fluctuation of development conditions and superior in effect of restraining dependence on development conditions.

**SOLUTION:** This heat-developable recording material has at least one image forming layer and contains an organic silver salt and a reducing agent and a compound represented by general formula I in which Z is an aromatic or heterocyclic or amino group; M is an H or silver or alkaline earth metal atom; (m) is 1 or 2, and it is 1 when M is a univalent atom, and it is 2 when M is a divalent atom; (n) is 0 or 1; and each of R1 and R2 is, independently, an H atom or a substituent and each may combine with Z to form a cyclic structure.



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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] Especially this invention relates to the heat developing sensitive material suitable for printing platemaking about a heat developing record ingredient.

[0002]

[Description of the Prior Art] The heat developing sensitive material which forms a photograph using a heat developing approach For example, U.S. Pat. No. 3152904, 3457075, And it is based on B. sherry (Shely) with D. Morgan (Morgan). "with heat Silver system (Thermally Processed Silver Systems) processed" (the 8th edition (Imaging Processes and Materials) of Imaging Processes and Materials Neblette) It is indicated in Sturge (Sturge), V. Walworth (Walworth), A. Shepp (Shepp) edit, the 2nd page, and 1969.

[0003] Such a heat developing sensitive material contains the color tone agent and reducing agent which control a reducible silver source (for example, organic silver salt), the photocatalyst (for example, silver halide) of the amount of catalytic activity, and a silver color tone in the condition of having usually distributed in the binder matrix. In ordinary temperature, although heat developing sensitive material is stable, it generates silver through the oxidation reduction reaction between the silver sources (it functions as an oxidizer) and reducing agents which can be returned when it heats to the elevated temperature after exposure (for example, 80 degrees C or more). This oxidation reduction reaction is promoted by the catalysis of the latent image generated in exposure. The silver generated by the reaction of the organic silver salt in an exposure field offers a black image, and, as for this, formation of nothing and an image is made in a non-exposing field and contrast.

[0004] However, in the present condition, such a heat developing sensitive material is used as the sensitized material for micros, and a medical-application sensitized material in many cases, and is [ only being partly used very much as a sensitized material for printing, and ]. That was because Dmax of the image obtained is low, and gradation is bearish, so image quality is remarkably bad as a sensitized material for printing.

[0005] Development of a sensitized material with them was desired strongly. [ high and the sensibility and Dmax which the scanner and imagesetter which have oscillation wavelength spread through 600-800nm widely, and have fitness in these output machines by development of laser or light emitting diode on the other hand in recent years, and ] [ high contrast ]

[0006] Moreover, in the printing field, loss in quantity of processing waste fluid is strongly desired from environmental preservation and a space-saving viewpoint in recent years. Then, it can be made to expose efficiently with a laser imagesetter, and the technique about the optical photosensitivity heat developing photograph ingredient of the printing application which can form the clear black image which has high resolution and sharpness is needed. With these light photosensitivity heat developing photograph ingredient, use of solution system processing chemicals is lost, it is more easy and the heat developing processing system which does not spoil an environment can be supplied to a customer.

[0007] By the way, although having image quality epicritic and resolving power with an expensive heat

developing sensitive material which used together polyhydroxy benzens, hydroxylamines, reductones, or hydrazines was indicated by U.S. Pat. No. 3667958, it turned out that the combination of this reducing agent tends to cause the rise of fogging.

[0008] Moreover, Dmax is high and there is the approach of adding the hydrazine derivative indicated by U.S. Pat. No. 5496695 into a record ingredient as an approach of obtaining the heat developing record ingredient whose gradation is high contrast. Thereby, although high Dmax and a heat developing record ingredient [ tone superhard ] could be obtained, it turned out that the level may be satisfied with all, such as sensibility, high contrast nature, Dmax, Dmin, a tone reproduction, and the shelf life of a compound, of level is not reached.

[0009] Moreover, by using the hydrazine derivative indicated by the Europe patent 762196A No. 1, although the improvement was found by high contrast nature and the shelf life of a compound, it turned out that level satisfying too still is not reached.

[0010] Furthermore, although the example which uses acrylonitrile as co-developer was shown, with the compound used here, sufficiently satisfactory high contrast nature was not obtained by U.S. Pat. No. 5545515 or U.S. Pat. No. 5635339, and it found that a developing time dependency was large.

[0011]

[Problem(s) to be Solved by the Invention] Therefore, the purpose of this invention has sensibility and high Dmax, and it is high contrast, and fluctuation of the photograph engine performance by fluctuation of development conditions, such as developing time and development temperature, is offering the heat developing record ingredient which was excellent in development condition dependence depressor effect few. Especially image quality is good and is offering the record ingredient for printing platemaking of perfect dry processing whose wet process's is unnecessary. Furthermore, it is offering the heat developing sensitive material which has the above outstanding properties.

[0012]

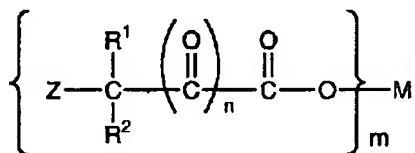
[Means for Solving the Problem] The above-mentioned purpose was attained by the following matters.

(1) The heat developing record ingredient characterized by including the compound expressed with organic silver salt, a reducing agent, and the following general formula (1) in the heat developing record ingredient which has much more image formation layer at least.

[0013]

[Formula 2]

一般式(1)



[0014] In [general formula (1)], Z expresses an aromatic series radical, a heterocycle radical, or the amino group, and M expresses a hydrogen atom, a silver atom, alkali metal, or alkaline earth metal. m expresses the integer of 1 or 2, and when M is a univalent atom and 1 and M are divalent atoms, it expresses 2. n expresses the integer of 0 or 1. R1 and R2 express a hydrogen atom or a substituent, respectively, even if they are the same respectively, they may differ from each other, and they may combine with Z, and may form cyclic structure.]

(2) A heat developing record ingredient given in the above (1) containing a photosensitive silver halide.

[0015]

[Embodiment of the Invention] Hereafter, this invention is explained to a detail. The heat developing record ingredient of this invention is a heat developing sensitive material which has at least one-layer image formation layer, contains organic silver salt and a reducing agent, and contains a photosensitive silver halide still more preferably. And it is desirable that it is an especially high contrast sensitized material for printing.

[0016] In such a heat developing record ingredient, by making the compound expressed with a general

formula (1) as a nucleating agent contain, sufficiently satisfactory high contrast nature is obtained, and fluctuation of the photograph engine performance by fluctuation of development conditions, such as developing time and development temperature, can be lessened, and the photograph engine performance which it was not based on development conditions but was fixed can be obtained. Moreover, Dmax is high and serves as high sensitivity. On the other hand, if a different compound from a general formula (1), for example, a hydrazine derivative, is used as a nucleating agent, coexistence of high contrast nature and development condition dependency depressor effect cannot be aimed at.

[0017] Next, the compound expressed with a general formula (1) is explained in detail. In a general formula (1), the phenyl group which the aromatic series radical expressed with Z is an aryl group of a monocycle or the condensed ring, for example, is guided from the benzene ring, a naphthalene ring, and an anthracene ring, a naphthyl group, an anthryl radical, etc. are mentioned. As a heterocycle radical expressed with Z, the heterocycle radical of the aromatic series or the non-aromatic compound of the saturation or partial saturation of a monocycle or the condensed ring is mentioned.

[0018] These may be permuted when Z expresses an aromatic series radical or a heterocycle radical. as a typical substituent -- for example, a halogen atom (a fluorine atom and the Krol atom --) a bromine atom or iodine atom, and an alkyl group (an aralkyl radical and a cycloalkyl radical --) The alkenyl radical containing an activity methine group etc., an alkynyl group, an aryl group, A heterocycle radical, the heterocycle radical (for example, pyridinio radical) containing the nitrogen atom formed into 4 class, An acyl group, an alkoxy carbonyl group, an aryloxy carbonyl group, A carbamoyl group, a carboxy group or its salt, a formyl group, a sulfonyl carbamoyl group, An acyl carbamoyl group, a sulfamoyl carbamoyl group, a carbazoyl radical, An oxalyl radical, an OKISA moil radical, an oxal radical, a cyano group, an isocyanato group, An iso thio cyanate group, a thio carbamoyl group, a hydroxy group, an alkoxy group (the radical which repeats and includes an ethyleneoxy radical or a propyleneoxy radical unit is included), An aryloxy group, a heterocycle oxy-radical, an acyloxy radical, carbonyloxy group (alkoxy \*\*\*\*\* is aryloxy), a carbamoyloxy radical, a sulfonyloxy radical, and the amino group (alkyl --), Aryl or the heterocycle amino group, the nitrogen-containing heterocycle radical of N-permutation, The acylamino radical, a sulfonamide radical, an ureido radical, a thio ureido radical, An imide radical, a carbonylamino (alkoxy \*\*\*\*\* is aryloxy) radical, A sulfamoylamino group, a semicarbazide radical, a thiosemicarbazide radical, A hydrazino radical, an amidino group, the ammonio radical of the 4th class, the OKISA moil amino group, A sulfonyl ureido radical, an acyl ureido radical, (Alkyl or aryl) an acyl sulfamoylamino group, a nitro group, and a sulfhydryl group (alkyl --), Aryl or a heterocycle thio radical, a sulfonyl group (alkyl or aryl), (Alkyl or aryl) A radical including a sulfinyl group, a sulfonic group or its salt, a sulfamoyl group, an acyl sulfamoyl group, a sulfonyl sulfamoyl group or its salt, a phosphoric-acid amide, or phosphoric ester structure, a silyl radical, a SUTANIRU radical, etc. are mentioned.

[0019] These substituents may be further permuted by these substituents.

[0020] When Z expresses the permutation amino group, the thing same as the substituent as the above-mentioned substituent is mentioned.

[0021] Although R1 and R2 express a hydrogen atom or a substituent, when R1 and R2 express a substituent, the same thing as the substituent which Z may have as the example is mentioned. R1 and R2 may combine with Z again, and they may form cyclic structure. The ring structure formed at this time is the ring or heterocycle of the monocycle or the condensed ring of non-aromatic saturation or partial saturation, and may have the same substituent as the substituent which Z may have.

[0022] M expresses a hydrogen atom, a silver atom, alkali metal (for example, a lithium, sodium, a potassium, caesium, etc.), and alkaline earth metals (for example, magnesium, calcium, barium, etc.). When n expresses the integer of 1 when M expresses a hydrogen atom, a silver atom, and alkali metal, and M expresses alkaline earth metal, n expresses the integer of 2.

[0023] Next, the desirable range of the compound expressed with the general formula (1) of this invention is described. As an aromatic series radical expressed with Z, the phenyl group which is not permuted [ a permutation or ] or a naphthyl group is desirable. Preferably as a heterocycle radical expressed with Z The aromatic series heterocycle radical of the monocycle or the condensed ring which

is not permuted [ a permutation or ], It is the non-aromatic heterocycle radical of the monocycle or the condensed ring which is not permuted [ the permutation containing at least one nitrogen atom, or ]. Or as heterocycle in these radicals For example, a furan ring, a thiophene ring, a pyrrole ring, a pyrazole ring, an imidazole ring, A triazole ring, a tetrazole ring, an oxazole ring, an isoxazole ring, A thiazole ring, an isothiazole ring, a pyridine ring, a pyridazine ring, a pyrimidine ring, A pyrazine ring, a triazine ring, a thiadiazole ring, a benzofuran ring, a benzothiophene ring, The Indore ring, an indazole ring, a benzimidazole ring, a benzotriazol ring, A benzooxazole ring, a benzothiazole ring, a quinoline ring, an isoquinoline ring, A quinoxaline ring, a phthalazine ring, a dibenzofuran ring, a carbazole ring, An aziridine ring, a pyrroline ring, a pyrrolidine ring, a pyrazoline ring, a pyrazolidine ring, An imidazoline ring, an imidazolidine ring, a piperidine ring, a piperazine ring, An oxazine ring, a morpholine ring, a thiazin ring, an indoline ring, an iso indoline ring, a benzothiazoline ring, a benzopiperidine ring, a phenoxazine ring, a phenothiazin ring, a hydantoin ring, a succinimide ring, etc. are mentioned. Among these, a furan ring, a thiophene ring, a pyrrole ring, a benzofuran ring, a benzothiophene ring, the Indore ring, a pyrrolidine ring, a piperidine ring, a morpholine ring, a piperazine ring, a pyrazole ring, a thiazole ring, a pyridine ring, a benzimidazole ring, a carbazole ring, a thiazin ring, an indoline ring, a benzothiazoline ring, a benzopiperidine ring, a phenothiazin ring, etc. are still more desirable.

[0024] Preferably [ when Z expresses an aromatic series radical or a heterocycle radical ] as a substituent which you may have A halogen atom, the alkyl group (for example, a methyl group and n-propyl group --) which is not permuted [ a permutation or ] n-butyl, a cyclohexyl radical, 3-hydroxypropyl radical, a hydroxymethyl group, A dimethyl aminomethyl radical, benzyl, t-butyl, t-octyl radical, A dicyano methyl group, an ethoxycarbonyl cyano methyl group, a methane sulfonyl cyano methyl group, A bis(ethoxycarbonyl) methyl group, a diphenyl methyl group, etc., the alkenyl radical (for example, a vinyl group and 2-ethoxycarbonyl vinyl group --) which is not permuted [ a permutation or ] 2-trifluoro-2-methoxycarbonyl vinyl group, 2, and 2-dicyanovinyl radical, Alkynyl groups which are not permuted [ a permutation or ], such as a 2-cyano-2-methoxycarbonyl vinyl group, The aryl group which is not permuted [ a permutation or ], a heterocycle radical, an acyl group, an alkoxy carbonyl group, An aryloxy carbonyl group, a carbamoyl group, a carboxy group, or its salt, A sulfonyl carbamoyl group, an acyl carbamoyl group, a sulfamoyl carbamoyl group, A carbazoyl radical, an oxalyl radical, an OKISA moil radical, a cyano group, a thio carbamoyl group, a hydroxy group and an alkoxy group (for example, a methoxy group, an ethoxy radical, and an iso butoxy radical --) Aryloxy groups, such as a dodeca NOKISHI radical, a heterocycle oxy-radical, an acyloxy radical, the amino group and the amino group (alkyl, aryl, or heterocycle) (for example, a dimethylamino radical --) A diethylamino radical, a dibutylamino radical, a dibenzylamino radical, a diphenylamino radical, the acylamino radicals (for example, a benzamide radical --), such as a propylamino radical Sulfonamide radicals (for example, bends sulfonamide radical etc.), such as an acetamide radical, An ureido radical, a thio ureido radical (for example, ethyl thio ureido radical etc.), An imide radical, a carbonylamino (alkoxy \*\*\*\*\* is aryloxy) radical, A sulfamoylamino group, a semicarbazide radical, a thiosemicarbazide radical, A hydrazino radical, the ammonio radical of the 4th class, the OKISA moil amino group, a sulfonyl (alkyl or aryl) ureido radical, An acyl ureido radical, an acyl sulfamoylamino group, a nitro group, a sulfhydryl group, A thio radical (for example, methylthio radical etc.), (Alkyl, aryl, or heterocycle) (Alkyl or aryl) A sulfonyl group, a sulfonic group or its salt, a sulfamoyl group, an acyl sulfamoyl group, a sulfonyl sulfamoyl group or its salt, silyl radicals (for example, trimethylsilyl radical etc.), etc. are mentioned.

[0025] Still more preferably The aryl group which is not permuted [ the alkyl group which is not permuted / a permutation or /, a permutation or ], The heterocycle radical which is not permuted [ a permutation or ], a halogen atom, an acyl group, an alkoxy carbonyl group, An aryloxy carbonyl group, a carbamoyl group, a carboxy group, or its salt, A hydroxy group, an alkoxy group, an aryloxy group, a heterocycle oxy-radical, The amino group, the amino group (alkyl, aryl, or heterocycle), the acylamino radical, A sulfonamide radical, an ureido radical, a thio ureido radical, an imide radical, a carbonylamino (alkoxy \*\*\*\*\* is aryloxy) radical, A nitro group, a sulfhydryl group, a thio (alkyl, aryl, or heterocycle) radical, They are a sulfonyl group, a sulfonic group or its salt, a sulfamoyl group, etc. (Alkyl or aryl) Preferably especially The following radicals with 0-30 total carbon, i.e., an alkyl group, an aryl group, a

heterocycle radical, A halogen atom, an acyl group, an alkoxy carbonyl group, a carbamoyl group, A carboxy group or its salt, a hydroxy group, an alkoxy group, the amino group, The amino group, the acylamino radical, (Alkyl, aryl, or heterocycle) A sulfonamide radical, an ureido radical, a thio ureido radical, an imide radical, a nitro group, They are a sulfhydryl group, a thio (alkyl, aryl, or heterocycle) radical, a sulfonyl group (alkyl or aryl), a sulfonic group or its salt, and a sulfamoyl group. Most preferably They are a hydroxy group, the amino group or the following radicals with 1-25 total carbon, i.e., an alkoxy group, an alkyl group, an alkylamino radical, an arylamino radical, and a sulfonamide radical.

[0026] It is a permutation amino group preferably as an amino group expressed with Z. Preferably as the substituent An alkyl group, An alkenyl radical, an alkynyl group, an aryl group, a heterocycle radical, an acyl group, An alkoxy carbonyl group, an aryloxy carbonyl group, a carbamoyl group, A formyl group, a sulfonyl carbamoyl group, an acyl carbamoyl group, a sulfamoyl carbamoyl group, A carbazoyl radical, an oxalyl radical, an OKISA moi radical, a thio carbamoyl group, A hydroxy group, an alkoxy group, the amino group, the amino group (alkyl, aryl, or heterocycle), The acylamino radical, a sulfonamide radical, an ureido radical, a thio ureido radical, the OKISA moi amino group, a sulfonyl group (alkyl or aryl), a sulfinyl group (alkyl or aryl), a sulfamoyl group, a silyl radical, etc. are mentioned. Still more preferably The alkenyl radical which is not permuted [ the alkyl group which is not permuted / a permutation or /, a permutation, or ], The aryl group which is not permuted [ the alkynyl group which is not permuted / a permutation or /, a permutation, or ], The heterocycle radical which is not permuted [ a permutation or ], an acyl group, an alkoxy carbonyl group, An aryloxy carbonyl group, a carbamoyl group, a formyl group, an oxalyl radical, They are an OKISA moi radical, a sulfonyl group (alkyl or aryl), a sulfamoyl group, etc. preferably especially the alkyl group (for example, a methyl group --) which is not permuted [ the following radicals with 1-30 total carbon, i.e., a permutation and ] An ethyl group, n-propyl group, n-butyl, a cyclohexyl radical, 3-hydroxypropyl radical, Benzyl, o-hydroxybenzyl radical, t-butyl, a diphenyl methyl group, etc., The heterocycle radical which is not permuted [ the aryl group which is not permuted / the alkenyl radical which is not permuted / a permutation or /, a permutation, or /, a permutation, or ], an acyl group, an alkoxy carbonyl group, a carbamoyl group, a formyl group, a sulfonyl group (alkyl or aryl), etc. are mentioned. They are an alkyl group with 1-30 total carbon, or an aryl group with 6-30 total carbon most preferably.

[0027] As Z, the aromatic series heterocycle radical which is not permuted [ the phenyl group which is not permuted / a permutation or /, a permutation, or ], the non-aromatic heterocycle radical containing at least one nitrogen atom, or the permutation amino group is still more desirable, and is the aromatic series heterocycle radical which is not permuted [ the phenyl group which is not permuted / a permutation or /, a permutation, or ] or a permutation amino group most preferably.

[0028] The heterocycle radical which is not permuted [ the aryl group which is not permuted / the alkenyl radical which be permuted / the alkyl group which be permuted / a hydrogen atom, a halogen atom, a permutation, or /, a permutation, or /, a permutation, or /, a permutation, or ], an acyl group, a cyano group, a hydroxy group, a sulfhydryl group, a thio (alkyl, aryl, or heterocycle) radical, an oxy-(alkyl, aryl, or heterocycle) radical, the amino group, the amino group (alkyl, aryl, or heterocycle), a hydrazino radical, a silyl radical, etc. are mentioned preferably as R1 and R2. Still more preferably The aryl group which is not permuted [ the alkyl group which is not permuted / a hydrogen atom, a permutation, or /, a permutation or ], an acyl group, a cyano group, a hydroxy group, and a sulfhydryl group (alkyl and aryl --), Or a heterocycle thio radical, an oxy-(alkyl, aryl, or heterocycle) radical, Come out and it is. the amino group and the amino group (alkyl, aryl, or heterocycle) -- especially -- desirable - - a hydrogen atom or the following radicals with 0-30 total carbon -- that is An alkyl group, an aryl group, an acyl group, a cyano group, a hydroxy group, a sulfhydryl group, A thio radical, an alkoxy group, the amino group, (Alkyl, aryl, or heterocycle) (Alkyl, aryl, or heterocycle) It is an amino group and they are a hydrogen atom, an alkyl group, an aryl group, an acyl group, a cyano group, a hydroxy group, an alkoxy group, a sulfhydryl group, an alkylthio group, an alkylamino radical, and an arylamino radical most preferably. Also when R1 or R2 combine with Z and they form cyclic structure, it is mentioned as a desirable example. As an example of the ring structure formed at this time, an indoline

ring, 2, a 3-dihydrobenzofuran ring, a coumarone ring, an indan ring, a fluorene ring, a pyrrolidine ring, 1, a 3-dihydroiso benzofuran ring, an iso indoline ring, an iso coumarone ring, a piperidine ring, an oxo-run ring, a thio run ring, an imidazolidine ring, 1, 3-dithiane ring, a dihydroacridine ring, etc. are mentioned.

[0029] It is a hydrogen atom, a silver atom, a lithium atom, a sodium atom, a potassium atom, a magnesium atom, etc. preferably as M, and a hydrogen atom, a silver atom, a sodium atom, and a potassium atom are especially desirable.

[0030] That of Z, R1, or R2 of a general formula (1) by which the ballast radical or polymer regularly used in additives for immobility photographs, such as a coupler, is incorporated in it is also desirable. To the photograph nature which has eight or more carbon numbers, a ballast radical is a comparatively inactive radical, for example, can be chosen from an alkyl group, an aralkyl radical, an alkoxy group, a phenyl group, an alkylphenyl radical, a phenoxy group, an alkyl phenoxy group, etc. Moreover, as a polymer, the thing of a publication is mentioned, for example to JP,1-100530,A.

[0031] Even if the adsorbent radical which adsorbs to silver salt into it is incorporated, Z, R1, or R2 of a general formula (1) are desirable again. As such an adsorption radical, an alkylthio group, an arylthio radical, a thiourea radical, U.S. Pat. No. 4,385,108, such as a thioamide radical, a mercapto heterocycle radical, and a triazole radical, Said 4,459,347 numbers, JP,59-195233,A, 59-200231, 59-201045, 59-201046, 59-201047, The radical indicated by 59-201048, 59-201049, JP,61-170733,A, 61-270744, 62-948, 63-234244, 63-234245, and 63-234246 is mentioned. Moreover, the adsorption radical to these silver salt may be precursor-ized. The radical indicated by JP,2-285344,A is mentioned as such a precursor.

[0032] Also when the radical expressed with Z of a general formula (1) has further the radical expressed with -CR1R2-(CO) n-COO-M1/m of a general formula (1) as the substituent, it is desirable. In this case, that compound is a compound suitable for calling it the dimer about the radical expressed with -CR1R2-(CO) n-COO-M1/m, or a trimer.

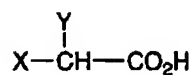
[0033] Moreover, in a general formula (1), R1 or R2 may be -CR1R2-(CO) n-COO-M1/m, R1 or R2 may have -CR1R2-(CO) n-COO-M1/m as a substituent, and still such -CR1R2-(CO) n-COO-M1/m may have Z.





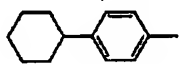



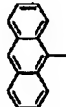
[0034] Next, the example of the compound shown by the general formula (1) is shown below. However, this invention is not limited to the following compounds.

[0035]

[Table 1]

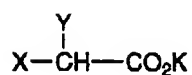


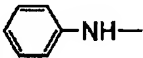

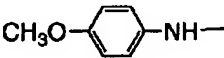
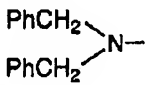
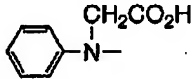
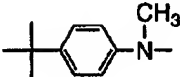
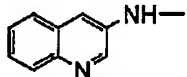
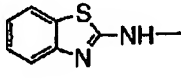


X \ Y	CH <sub>3</sub>	Ph	OH	OCH <sub>3</sub>	Si(CH <sub>3</sub> ) <sub>3</sub>
(C <sub>2</sub> H <sub>5</sub> ) <sub>2</sub> N- 	1a	1b	1c	1d	1e
CH <sub>3</sub> O- 	2a	2b	2c	2d	2e
Ph <sub>2</sub> N- 	3a	3b	3c	3d	3e
CH <sub>3</sub> O-  CH <sub>3</sub> O	4a	4b	4c	4d	4e
	5a	5b	5c	5d	5e
PhCONH- 	6a	6b	6c	6d	6e
HO <sub>2</sub> C- 	7a	7b	7c	7d	7e
CH <sub>3</sub> S- 	8a	8b	8c	8d	8e
	9a	9b	9c	9d	9e

[0036]

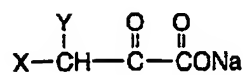
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
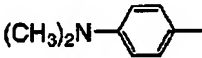
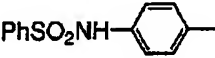
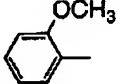
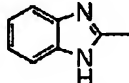
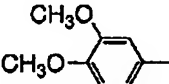

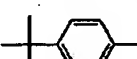
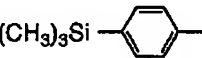


$\begin{array}{c} \text{Y} \\ \diagdown \\ \text{X} \end{array}$	CH <sub>3</sub>	OH	Ph	H	CH <sub>2</sub> CO <sub>2</sub> H
	10a	10b	10c	10d	10e
	11a	11b	11c	11d	11e
(C <sub>2</sub> H <sub>5</sub> ) <sub>2</sub> N—	12a	12b	12c	12d	12e
	13a	13b	13c	13d	13e
	14a	14b	14c	14d	14e
	15a	15b	15c	15d	15e
	16a	16b	16c	16d	16e
	17a	17b	17c	17d	17e
	18a	18b	18c	18d	18e

[0037]

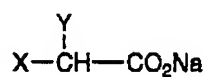
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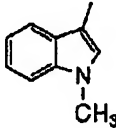
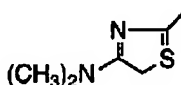
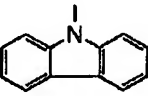
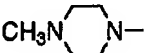



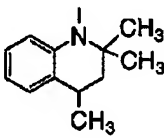
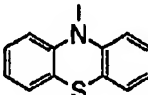


$\begin{array}{c} \text{Y} \\ \text{X} \end{array}$	H	CH <sub>3</sub>	Ph	OCH <sub>3</sub>	N(CH <sub>3</sub> ) <sub>2</sub>
	19a	19b	19c	19d	19e
	20a	20b	20c	20d	20e
	21a	21b	21c	21d	21e
	22a	22b	22c	22d	22e
	23a	23b	23c	23d	23e
	24a	24b	24c	24d	24e
	25a	25b	25c	25d	25e
	26a	26b	26c	26d	26e
	27a	27b	27c	27d	27e

[0038]

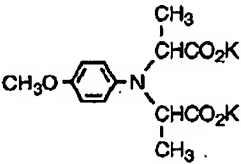
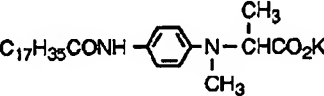
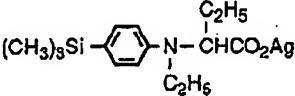
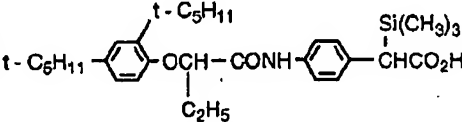
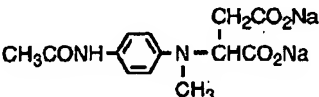
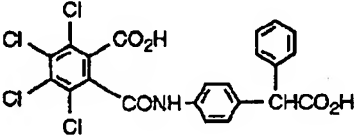
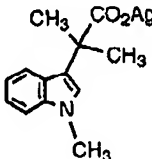
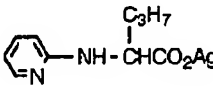
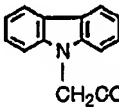
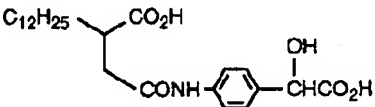
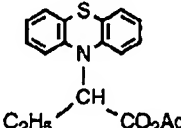
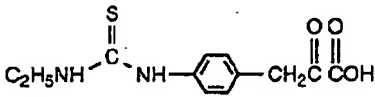
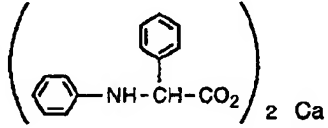
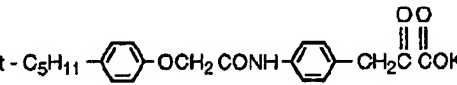
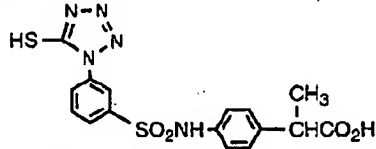
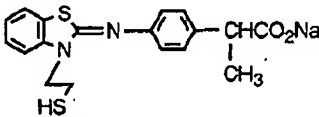
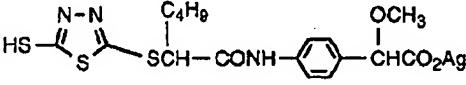
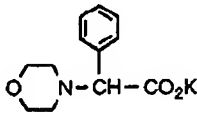
[Table 4]



$\begin{array}{c} \text{Y} \\ \diagdown \\ \text{X} \end{array}$	CH <sub>3</sub>	Ph	OH	Si(CH <sub>3</sub> ) <sub>3</sub>	OCH <sub>3</sub>
	28a	28b	28c	28d	28e
	29a	29b	29c	29d	29e
	30a	30b	30c	30d	30e
	31a	31b	31c	31d	31e
	32a	32b	32c	32d	32e
	33a	33b	33c	33d	33e
	34a	34b	34c	34d	34e
	35a	35b	35c	35d	35e
	36a	36b	36c	36d	36e

[0039]

[Table 5]

	37		38
	39		40
	41		42
	43		44
	45		46
	47		48
	49		50
	51		52
	53		54

[0040]

[Table 6]

	55		56
	57		58
	59		60
	61		62
	63		64
	65		66
	67		68
	69		70
	71		72

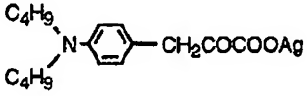
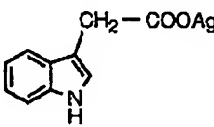
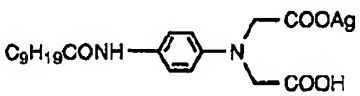
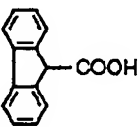
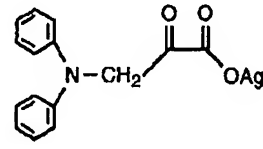
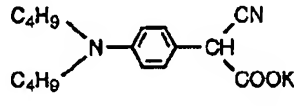
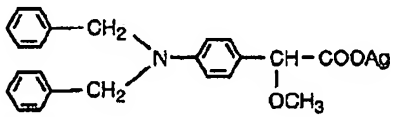
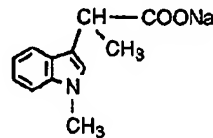
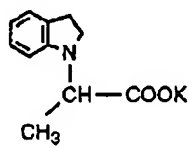
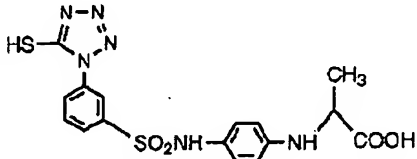
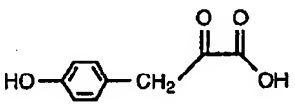
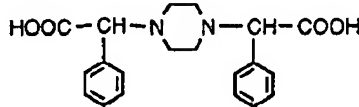
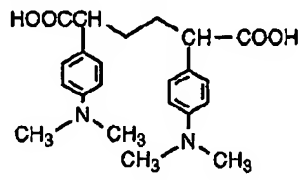
[0041]

[Table 7]

	73		74
	75		76
	77		78
	79		80
	81		82
	83		84
	85		86
	87		88
	89		90

[0042]

[Table 8]

	91		92
	93		94
	95		96
	97		98
	99		100
	101		102
	103		

[0043] The compound expressed with the general formula (1) of this invention is compoundable by well-known various approaches. Although the synthesis method cannot mention the synthesis method which can become general with each compound since the optimal thing is chosen, some examples of the useful synthetic root are shown below also in it.

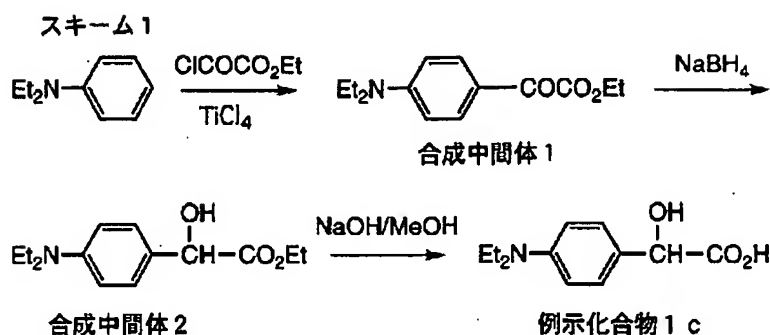
[0044] (Synthetic example)

(Composition of instantiation compound 1c) Instantiation compound 1c was compounded according to the scheme 1.

[0045]

[Formula 3]





[0046] (Composition of the synthetic intermediate product 1) 10.3ml of bottom titanium tetrachlorides of ice-cooling was added to 200ml solution of methylene chlorides of 15ml of N,N-diethylaniline, and, subsequently chloro glyoxylic-acid ethyl 10.5g 10ml solution of methylene chlorides was dropped at it. At the room temperature, dilute hydrochloric acid and a methylene chloride were added, the liquid separation extract was carried out after 3-hour stirring, and the solvent was distilled off after drying an organic layer. 5g of intermediate fields 1 was obtained by purification by the silica gel column chromatography.

[0047] (Composition of the synthetic intermediate field 2) Intermediate field 1 0.2g of bottom sodium borohydrides of ice-cooling was added to the 3.1g methanol 30ml solution, and it agitated at the room temperature for 1 hour. 2.7g of intermediate fields 2 was obtained by adding dilute hydrochloric acid and ethyl acetate and distilling off a solvent after a liquid separation extract.

[0048] (Composition of instantiation compound 1c) Intermediate field 2 6ml of 2-N sodium-hydroxide water solutions was added to the 2.7g methanol 25ml solution, and it agitated at the room temperature for 4 hours. After having added dilute hydrochloric acid, making the reaction solution into acidity and distilling off a solvent, 1.9g instantiation compound 1c was obtained by purification by the silica gel column chromatography.

[0049] (Composition of instantiation compound 3c) In composition of instantiation compound 1c, instantiation compound 3c was compounded by completely performing same actuation except using N and N-diphenyl aniline instead of using N,N-diethylaniline.

[0050] (Composition of instantiation compound 10a) 1.9g of potassium hydroxides was added to N-phenylalanine methyl ester 5g water, ethanol, and 30ml of tetrahydrofuran mixed solutions, and the heating ring current was performed for 2 hours. 3g instantiation compound 10a was obtained by ice-cooling a reaction solution, \*\*\*\*(ing) the depositing solid-state, and drying.

[0051] In addition, N-phenylalanine methyl ester used for the reaction was compounded as follows. After adding 45.5g of potassium carbonate, and 6.6g of potassium iodide to an aniline 30ml acetonitrile 300ml solution, 44ml of 2-BUROMO methyl propionates was dropped, and the heating ring current was performed for 3 hours. A part for a solid-state was carried out the \*\* exception after radiationnal cooling, the methylene chloride and the sodium-hydrogencarbonate water solution were added, the liquid separation extract was carried out, and 25g of N-phenylalanine methyl ester was obtained by vacuum distillation after desiccation.

[0052] (Composition of instantiation compound 11a) The diphenylamine 50g DMF160ml solution was slowly dropped at the dimethylformamide (DMF) 40ml solution of 22g (65%) of sodium hydride under ice-cooling. After agitating at a room temperature for 3 hours, it ice-cooled again, and 35ml of 2-BUROMO methyl propionates was added, and it agitated at the room temperature for 1 hour. Ethyl acetate and water were added, the liquid separation extract was carried out, and it distilled after drying an organic layer. After adding 300ml of 2-N potassium-hydroxide water solutions to the obtained distilland and carrying out a heating ring current for 4 hours, 15g instantiation compound 11a was obtained by \*\*\*\*(ing) the solid-state which deposited by ice-cooling, and drying.

[0053] (Composition of instantiation compound 16a) In composition of instantiation compound 11a, instantiation compound 16a was compounded by completely performing same actuation except using 4-t-butyl monomethylamine instead of using a diphenylamine.

[0054] (Composition of instantiation compound 30a) In composition of instantiation compound 11a, instantiation compound 16a was compounded by completely performing same actuation except using 4-t-butyl monomethylamine instead of using a diphenylamine.

[0055] One sort of compounds used for this invention may be used, or may use two or more sorts together. Moreover, besides the above-mentioned thing, the following hydrazine derivative is also used preferably. (It can also combine and use depending on the case.) The hydrazine derivative used for this invention is compoundable by the various approaches indicated by the following patent again.

[0056] All the hydrazine derivatives given in US JP,5496695,B They are all the hydrazine derivatives of a publication to Europe JP,762196,B A1 No. With the compound expressed with the (\*\* 1) of a publication to JP,6-77138,B, they are specifically a page 3 of the said official report, and the compound of a 4-page publication. the compound expressed with the general formula (I) of a publication to JP,6-93082,B -- concrete -- page [ of the said official report ] 8 - the compound of 1-38 of a 18-page publication. They are specifically the compound 6-1 of the page 25 of the said official report, the compound 4-1 of a 26-page publication - a compound 4-10, the compound 5-1 to 5-42 of a 28 pages - 36 pages publication and 39 pages, and a 40-page publication - a compound 6-7 with the compound expressed with the general formula (4), general formula (5), and general formula (6) of a publication to JP,6-230497,A. the compound expressed with the general formula (1) and general formula (2) of a publication to JP,6-289520,A -- concrete -- page [ of the said official report ] 5 - compound 1-1- of a 7-page publication -- 1-17 and 2-1. JP,6-313936,A -- a publication -- and (\*\* 2) (\*\* 3) the compound expressed -- concrete -- page [ of the said official report ] 6 - the compound of a 19-page publication. the compound expressed with the (\*\* 1) of a publication to JP,6-313951,A -- concrete -- page [ of the said official report ] 3 - the compound of a 5-page publication. the compound expressed with the general formula (I) of a publication to JP,7-5610,A -- concrete -- page [ of the said official report ] 5 - the compound I-1 to I-38 of a 10-page publication. the compound expressed with the general formula (II) of a publication to JP,7-77783,A -- concrete -- page [ of the said official report ] 10 - compound II-1-II-102 of a 27-page publication. the compound expressed with the general formula (H) and general formula (Ha) of a publication to JP,7-104426,A -- concrete -- page [ of the said official report ] 8 - the compound H-1 to H-44 of a 15-page publication. It is specifically the compound N-1 to N-30 given in this official report with the compound which is a compound characterized by having the nonionic radical which forms the hydrogen atom and intramolecular hydrogen bond of an anionic radical or a hydrazine near the hydrazine radical of a publication, and is especially expressed with a general formula (A), a general formula (B), a general formula (C), a general formula (D), a general formula (E), and a general formula (F) to EP-713131A No. With the compound expressed with the general formula (1) of a publication to EP-713131A No., it is specifically the compound D-1 to D-55 given in this official report.

[0057] The hydrazine derivative of the versatility of the 34-page publication from 25 pages of "the well-known technique (1-207 pages)" (the Aztec company \*\*) of March 22, 1991 issue furthermore. The compound D-2 of JP,62-86354,A (6 pages - 7 pages), and D-39.

[0058] The following compound can be used together and used in this invention again. Namely, all the acrylonitrile derivatives given in US JP,5545515,B All the acrylonitrile derivatives given in US JP,5635339,B All the compounds furthermore expressed [ Japanese Patent Application No. / No. 240511 / nine to ] with the general formula (I) of a publication, and (II)

[0059] The compound of this invention can be dissolved and used for water or a suitable organic solvent (a methanol, ethanol, propanol, fluorination alcohol), for example, alcohols, ketones (an acetone, methyl ethyl ketone), dimethylformamide, dimethyl sulfoxide, methyl Cellosolve, etc.

[0060] Moreover, with the emulsification variational method already known well, it can dissolve using auxiliary solvents, such as oil, such as dibutyl phthalate, tricresyl phosphate, glyceryl triacetate, or diethyl phthalate, ethyl acetate, and a cyclohexanone, and an emulsification distribution object can be produced and used mechanically. Or by the approach learned as a solid-state variational method, into suitable solvents, such as water, a ball mill, a colloid mill, or a supersonic wave can distribute, and the powder of a compound can be used.

[0061] Although you may add to a base material in the layer by the side of an image formation layer,

i.e., an image formation layer, and any of other layer, as for the compound of this invention, it is desirable to add in the layer which adjoins an image recording layer or it.

[0062] The addition of the nucleating agent of this invention has desirable  $1 \times 10^{-6}$  mol to one mol of silver, its  $1 \times 10^{-5}$  to 5ten - one mol is more desirable, and its  $2 \times 10^{-5}$  to 2ten - one mol is the most desirable.

[0063] Although the organic silver salt which can be used for this invention is comparatively stable, when it is heated more than 80 degrees C or it to light under existence of the exposed photocatalysts (latent image of a photosensitive silver halide etc.) and a reducing agent, it is silver salt which forms a silver image. Organic silver salt may be the organic substance of arbitration including the source which can return complex ion. The silver salt (a carbon number 10-30, preferably 15-28) of an organic acid, especially the silver salt of a long-chain fat carboxylic acid are desirable. The complex of organic [ which has the \*\* stable constant of the range of 4.0-10.0 ], or inorganic silver salt also has a desirable ligand. Silver feed materials can constitute about 5 - 70% of the weight of an image formation layer preferably. Desirable organic silver salt contains the silver salt of the organic compound which has a carboxyl group. Although these examples contain the silver salt of aliphatic carboxylic acid, and the silver salt of aromatic carboxylic acid, they are not limited to these. As a desirable example of the silver salt of aliphatic carboxylic acid, behenic acid silver, arachidic acid silver, stearic acid silver, silver oleate, silver laurate, caproic-acid silver, myristic-acid silver, palmitic-acid silver, maleic-acid silver, fumaric-acid silver, silver tartarate, silver linoleate, silver butyrate and silver camphorate, such mixture, etc. are included.

[0064] The silver salt and these derivatives of the compound containing a sulfhydryl group or a thione radical can also be used. As a desirable example of these compounds, it is 3-mercapto-4-phenyl - 1, 2, silver salt of 4-triazole, The silver salt of 2-mercaptobenzimidazole, the silver salt of 2-mercapto-5-aminothiadiaazole, The silver salt of thioglycolic acid, such as silver salt of 2-(ethyl glycol amide) benzothiazole, and silver salt of S-alkylthio glycolic acid (the carbon numbers of an alkyl group are 12-22 here), The silver salt of dithiocarboxylic acids, such as silver salt of a dithio acetic acid, the silver salt of the thioamide, 5-carboxyl - Silver salt of a 1-methyl-2-phenyl-4-thio pyridine, The silver salt of mercapto triazine, the silver salt of 2-mercapto benzoxazole, (Silver salt, for example, 3-amino-5-benzyl thio, given in U.S. Pat. No. 4,123,274 - 1, such as silver salt of 1, 2, and 4-thiazole, 2, silver salt of 4-mercapto thiazole derivative) The silver salt of thione compounds, such as silver salt of 3-(3-carboxyethyl)-4-methyl-4-thiazoline-2-thione of a publication, is included in U.S. Pat. No. 3,301,678. Furthermore, the compound containing an imino group can also be used. As a desirable example of these compounds, the silver salt of the silver salt of 1 like publication, 2, and 4-triazole or 1-H-tetrazole, an imidazole, and an imidazole derivative etc. is included in the silver salt of halogenation benzotriazols, such as silver salt of benzotriazols, such as silver salt of benzotriazol, and those derivatives, for example, methyl benzotriazol silver etc., and 5-chlorobenzo triazole silver, and U.S. Pat. No. 4,220,709. For example, various silver-acetylde compounds like a publication can also be used for U.S. Pat. No. 4,761,361 and 4,775,613.

[0065] Although there is especially no limit as a configuration of the organic silver salt which can be used for this invention, the needle crystal which has a minor axis and a major axis is desirable. In this invention, 0.20 micrometers or less of minor axes 0.01 micrometers or more and 5.0 micrometers or less of 0.10-micrometer or more major axes are desirable, and 0.15 micrometers or less of minor axes 0.01 micrometers or more and 4.0 micrometers or less of 0.10-micrometer or more major axes are more desirable. As for grain-size distribution of organic silver salt, it is desirable that it is mono dispersion. The percentage of the value which broke the standard deviation of the die length of a minor axis and each major axis by the minor axis and each major axis is desirable, and mono dispersion is 50% or less still more preferably 80% or less more preferably 100% or less. As a measuring method of the configuration of organic silver salt, it can ask from the transmission electron microscope image of an organic silver salt distribution object. The percentage (coefficient of variation) of the value which there is a method of asking for the standard deviation of the volume weighted average diameter of organic silver salt as an option which measures mono dispersion nature, and was broken by the volume weighted

average diameter is 50% or less still more preferably 80% or less more preferably 100% or less. Laser light is irradiated at the organic silver salt distributed for example, in liquid as a measuring method, and it can ask from the grain size (volume weighted average diameter) obtained by being and asking for the autocorrelation function to time amount change of fluctuation of the scattered light to carry out.

[0066] Organic silver salt which can be used for this invention can be desalted preferably. Although there is especially no limit as an approach of desalting and a well-known approach can be used, the well-known filtration approaches, such as flocculation rinsing by centrifugal filtration, suction filtration, the ultrafiltration, and the condensation method, can be used preferably.

[0067] The organic silver salt which can be used for this invention is the purpose which obtains a particle without condensation with a small grain size, and may be used as a solid-state particle distribution object which used the dispersant. The approach of carrying out the solid-state particle decentralization of the organic silver salt can be mechanically distributed using a well-known detailed-ized means (for example, a ball mill, a vibration ball mill, a planet ball mill, a sand mill, a colloid mill, a jet mill, a roller mill) under existence of a distributed assistant.

[0068] In case solid-state atomization of the organic silver salt is carried out using a dispersant For example, the copolymer of polyacrylic acid and an acrylic acid, a maleic-acid copolymer, A maleic-acid monoester copolymer, an acryloyl methyl propane sulfonic-acid copolymer, Semisynthesis anion polymers, such as which synthetic anion polymer, carboxymethyl starch, and a carboxymethyl cellulose, Anionic polymers, such as an alginic acid and a pectic acid, JP,52-92716,A, An anionic surfactant given in WO 88/No. 04794 etc., the compound of a Japanese Patent Application No. [ No. 350753 / seven to ] publication, Or anionic [ well-known ], nonionicity, and a cationic surfactant, In addition, polyvinyl alcohol, a polyvinyl pyrrolidone, a carboxymethyl cellulose, The high molecular compound which exists in natures, such as well-known polymers, such as hydroxypropylcellulose and hydroxypropyl methylcellulose, or gelatin, can be chosen suitably, and can be used.

[0069] Although it is a general approach, mixing a distributed assistant with the powder of organic silver salt or the organic silver salt of a wet cake condition before distribution, and sending into a disperser as a slurry performs heat treatment and processing by the solvent, where organic silver salt is mixed beforehand, and it is good also as organic silver salt powder or a wet cake. pH control may be carried out with pH regulator suitable before and after distribution or during distribution.

[0070] It rough-distributes in a solvent by carrying out pH control, and pH may be changed and may be made to atomize under existence of a distributed assistant after that also besides distributing mechanically. At this time, an organic solvent may be used as a solvent used for rough distribution, and an organic solvent is usually removed after atomization termination.

[0071] The prepared distributed object can be saved, stirring in order to suppress sedimentation of the particle at the time of preservation, or can also be saved with hydrophilic colloid in the viscous high condition (for example, condition made into the shape of jelly using gelatin). Moreover, antiseptics can also be added in order to prevent propagation of the saprophytic bacteria at the time of preservation etc.

[0072] Although the organic silver salt of this invention can be used in a desired amount, the amount per two shows 1m of heat developing record ingredients, and 0.1 - 5 g/m<sup>2</sup> is 1-3g/m<sup>2</sup> desirable still more preferably as a silver content.

[0073] When using the heat developing record ingredient of this invention as a light-and-heat record ingredient, a photosensitive silver halide can be used further. In this case, the formation approach of a photosensitive silver halide can use the approach which is learned well, for example, is indicated by No. 17029 and U.S. Pat. No. 3,700,458 in research disclosure June, 1978 in this industry. The approach of preparing a photosensitive silver halide particle and mixing with organic silver salt can be used by adding a silver supply compound and a halogen supply compound in the approach, the gelatin, or other polymer solutions which change some silver of organic silver salt into a photosensitive silver halide by adding a halogen content compound in the prepared organic silver salt as a concrete approach of using by this invention. In this invention, the latter approach can be used preferably. It is desirable that it is small for the purpose which suppresses the nebula after image formation low, and the grain size of a photosensitive silver halide specifically has more preferably 0.02 micrometers or more still more

preferably good 0.14 micrometers or less 0.01 micrometers or more 0.16 micrometers or less 0.20 micrometers or less. A grain size here means the die length of \*\* of a silver halide particle, when a silver halide particle is the so-called normal \*\* of a cube or octahedron. Moreover, when a silver halide particle is a plate-like particle, the diameter when converting into the circle image of the projected area on the front face of main and this area is said. In addition, when it is not normal \*\*, in the case of a spherical particle, a cylindrical particle, etc., the diameter when considering a ball equivalent to the volume of a silver halide particle is said.

[0074] Although a cube, octahedron, plate-like particle, spherical particle, cylindrical particle, and potato-like particle etc. can be mentioned as a configuration of a silver halide particle, especially in this invention, a cube-like particle and a plate-like particle are desirable. the average aspect ratio in the case of using a plate-like silver halide particle -- desirable -- 100:1-2:1 -- 50:1-3:1 are more preferably good. Furthermore, the particle to which the corner of a silver halide particle was round can also be used preferably. Although there is especially no limit about the indices of crystal plane (Miller indices) of the outside surface of a photosensitive silver halide particle, it is desirable that the rate that the {100} sides where spectral sensitization effectiveness when spectral sensitization coloring matter adsorbs is high occupy is high. As the rate, 50% or more is desirable, 65% or more is more desirable, and 80% or more is still more desirable. T.Tani;J.Imaging Sci. using the adsorption dependency of the {111} sides and {100} sides in adsorption of sensitizing dye and 29,165 (1985) can be asked for the ratio of a Miller-indices {100} side by the approach of a publication. As a halogen presentation of a photosensitive silver halide, there may not be especially a limit and may be any of a silver chloride, silver chlorobromide, a silver bromide, iodine silver bromide, YOU silver chlorobromide, and a silver iodide. Although distribution of the halogen presentation in a particle may be uniform, and that from which the halogen presentation changed in the shape of a step may be used or what changed continuously may be used, an iodine-silver-bromide particle with the silver-iodide content high as a desirable example inside a particle can be used. Moreover, the silver halide particle which has a core/shell structure preferably can be used. as structure -- desirable -- 2-5-fold structure -- the core / shell particle of 2-4-fold structure can be used more preferably.

[0075] As for the photosensitive silver halide particle which can be used for this invention, it is desirable to carry out kind content of the complex of the metal chosen from a rhodium, a rhenium, a ruthenium, an osmium, iridium, cobalt, mercury, or iron at least. The number of these metal complexes one, and they may use together two or more sorts of complexes of a metal of the same kind and a dissimilar metal. Desirable content has the desirable range of 1nmol to 10m mol to one mol of silver, and its range of 100micro mol is more desirable from 10nmol. The metal complex of the structure indicated by JP,7-225449,A etc. as structure of a concrete metal complex can be used. About the compound of cobalt and iron, a 6 cyano metal complex can be used preferably. As an example, although ferricyanic acid ion, ferrocyanic acid ion, hexa cyano cobalt acid ion, etc. are mentioned, it is not limited to these. Even if it makes homogeneity contain the metal complex in a silver halide, the core section may be made to contain in high concentration, or the shell section may be made to contain in high concentration, and there is especially no limit.

[0076] Although the noodle method, the flocculation method, etc. can be desalted by rinsing of the approach learned for this industry, even if a photosensitive silver halide particle desalts them in this invention, it is not necessary to carry out it.

[0077] As for the photosensitive silver halide particle which can be used for this invention, it is desirable that chemical sensitization is carried out. A sulfur sensitization method, a selenium sensitization method, and a tellurium sensitization method can be used as well known for this industry as a desirable chemical sensitization method. Moreover, noble-metals sensitization methods and reduction sensitization methods, such as a gold compound, platinum, palladium, and an iridium compound, can be used. Although a compound well-known as a compound preferably used for a sulfur sensitization method, a selenium sensitization method, and a tellurium sensitization method can be used, the compound of a publication can be used for JP,7-128768,A etc. As a tellurium sensitizer, for example, diacyl telluride and bis(oxycarbonyl) telluride, Bis(carbamoyl) telluride, diacyl telluride, a bis(oxycarbonyl)ditelluride

group, A bis(carbamoyl)ditelluride group, the compound which has P=Te association, TERURO carboxylate, Te-organil tellurocarboxylic-ester, JI (Pori) telluride, telluride, TERURORU, TERURO acetals, a tellurosulfonate group, the compound that has P-Te association, \*\* Te heterocycles, a TERURO carbonyl compound, an inorganic tellurium compound, a colloid tellurium, etc. can be used. The compound indicated by chloroauric acid, a potassium clo ROO rate, kalium aurithiocyanate, a gold sulfide, golden SERENAIDO or a U.S. Pat. No. 2,448,060 number, British JP,618,061,B, etc. as a compound preferably used for a noble-metals sensitization method can be used preferably. As a concrete compound of a reduction sensitization method, a stannous chloride, aminoiminomethanesulfinic acid, a hydrazine derivative, a borane compound, a silane compound, polyamine compound, etc. can be used other than an ascorbic acid and a thiourea dioxide. Moreover, reduction sensitization of the pH of an emulsion can be carried out by holding and riping 7 or more and pAg or less to 8.3. Moreover, reduction sensitization can be carried out by introducing the single addition part of complex ion during particle formation.

[0078] When using a photosensitive silver halide by this invention, as amount of the photosensitive silver halide used, 0.5 mols or less of photosensitive 0.01-mol or more silver halides are desirable to one mol of organic silver salt, 0.02 mols or more 0.3 mols or less are more desirable, and 0.03 mols or more especially 0.25 mols or less are desirable. About the mixed approach of the photosensitive silver halide prepared separately and organic silver salt, and mixed conditions The silver halide particle and the organic silver salt which carried out preparation termination, respectively A high-speed agitator and a ball mill, the approach of mixing with a sand mill, a colloid mill, a vibration mill, a homogenizer, etc. -- or, although there is a method of mixing the photosensitive silver halide which carried out preparation termination to the timing of either of preparation of organic silver salt, and preparing organic silver salt etc. In the limitation which fully appears, especially a limit does not have the effectiveness of this invention.

[0079] As the silver halide method of preparation used by this invention, the so-called HARAIDESHON method which halogenates some silver of organic silver salt by the organic or inorganic halogenide is also used preferably. Although what kind of object is sufficient as long as it is with the compound which reacts with organic silver salt as an organic halogenide used here, and generates a silver halide, the meeting object (pyridinium bromide perbromide) of N-halogeno imide (N-bromosuccinimide etc.), the 4th class nitride of halogenation, and the 4th class nitrogen salts (bromination tetrabutylammonium etc.) of halogenation and a halogen molecule etc. is mentioned. Although what kind of object is sufficient as long as it is with the compound which reacts with organic silver salt as an inorganic halogenated compound, and generates a silver halide, there are an alkali halide metal or ammonium (a sodium chloride, a lithium bromide, a potassium iodide, ammonium bromide, etc.), alkali halide earth metals (a calcium bromide, magnesium chloride, etc.), halogenation transition metals (ferric chloride, bromination the 2nd copper etc.), metal complexes (bromination iridium acid sodium, rhodium chloride acid ammonium, etc.) that have a halogen ligand, a halogen molecule (a bromine, chlorine, iodine), etc. Moreover, a desired organic inorganic halogenide may be used together.

[0080] It is this invention, 1m mol -500m mol is desirable as a halogen atom per one mol of organic silver salt as an addition of the halogenide at the time of HARAIDESHON, and 10m mol -250m mol is still more desirable.

[0081] It is desirable that the reducing agent for organic silver salt is included in the heat developing record ingredient of this invention. the matter of arbitration with which the reducing agent for organic silver salt returns complex ion to metal silver -- you may be an organic substance preferably. Although the conventional photograph developers, such as phenidone, hydroquinone, and a catechol, are useful, a hindered phenol reducing agent is desirable. As for a reducing agent, it is desirable to be contained 5 to 50% (mol) to one mol of silver of the field which has an image formation layer, and it is still more desirable to be contained at 10 - 40% (mol). What kind of layer of the field which has an image formation layer is sufficient as the addition layer of a reducing agent. When adding in layers other than an image formation layer, it is desirable to use it more mostly with 10 - 50% (mol) to one mol of silver. Moreover, a reducing agent may be the so-called precursor induction-ized so that it might have a



function effectively only at the time of development.

[0082] In the heat developing record ingredient using organic silver salt a wide range reducing agent JP,46-6074,A, 47-1238, 47-33621, 49-46427, 49-115540, 50-14334, 50-36110, 50-147711, 51-32632, 51-1023721, 51-32324, 51-51933, 52-84727, 55-108654, 56-146133, 57-82828, 57-82829, JP,6-3793,A, U.S. Pat. No. 3,667, No. 9586, Said 3,679,426 numbers, said 3,751,252 numbers, said 3,751,255 numbers, said -- No. 3,761,270 -- said -- No. 3,782,949 -- said -- No. 3,839,048 -- said -- No. 3,928,686 -- said -- it is indicated by No. 5,464,738, Germany patent No. 2321328, Europe JP,692732,B, etc. For example, a phenyl amide oxime, 2-thienyl amide oxime (And amide oxime;, for example, 4-hydroxy, such as p-phenoxyphenyl amide oxime - 3) Azines, such as 5-dimethoxy benzaldehyde azine; The combination; polyhydroxy benzene of the aliphatic-carboxylic-acid aryl hydrazide and the ascorbic acid like the combination of 2 and 2-bis(hydroxymethyl) propionyl-beta-phenylhydrazine and an ascorbic acid, A hydroxylamine, a reductone, and/or combination of a hydrazine (for example, with hydroquinone) Combination of a bis(ethoxyethyl) hydroxylamine, a piperidino hexose reductone, or a formyl-4-methylphenyl hydrazine etc.; Phenyl hydroxamic acid, Hydroxamic acid, such as p-hydroxyphenyl hydroxamic acid and beta-Ali Nin hydroxamic acid; The combination of an azine and a sulfonamide phenol ; Ethyl-alpha-cyano-2-methylphenyl acetate, (For example, phenothiazin, 2, a 6-dichloro-4-benzenesulfonamide phenol, etc.) alpha-cyanophenyl acetic-acid derivatives, such as ethyl-alpha-cyanophenyl acetate; 2 and 2-dihydroxy -1, 1-binaphthyl, Screw-beta-naphthol which is illustrated by 6 and 6-dibromo -2, 2-dihydroxy -1, 1-binaphthyl, and bis(2-hydroxy-1-naphthyl) methane; the screw-beta-naphthol, and 1, 3-dihydroxybenzene derivative (for example) Combination;3-methyl-1-phenyl-5-pyrazolones, such as 2 and 4-dihydroxy benzophenone or 2, and 4-dihydroxy acetophenone, etc., 5-pyrazolone; A dimethylamino hexose reductone, Anhydrodihydroaminohexose reductone And a reductone which is illustrated by the anhydro JIHIDOROPIPERIDON hexose reductone; Sulfonamide phenol reducing-agents [, such as a 2 and 6-dichloro-4-benzenesulfonamide phenol and p-benzenesulfonamide phenol, ]; 1, such as chroman;2, such as 2, 2-dimethyl-7-t-butyl-6-hydroxychroman, etc., such as 2-phenyl indan -1 and 3-dione, 6-dimethoxy -3, 5-JIKARUBO ethoxy -1, and a 4-dihydropyridine, a 4-dihydropyridine; bisphenol; (for example) Bis(2-hydroxy-3-t-butyl-5-methylphenyl) methane, A 2 and 2-bis(4-hydroxy-3-methylphenyl) propane, 4, and 4-ethylidene-screw (2-t-butyl-6-methyl phenol), 1, 1, - screw (2-hydroxy - 3, 5-dimethylphenyl) -; ascorbic-acids derivative, such as a 3, 5, and 5-trimethyl hexane and 2, and 2-bis(3, 5-dimethyl-4-hydroxyphenyl) propane An aldehyde and ketones, such as; benzyl, and a biacetyl; (For example, 1-ascorbyl palmitate, ascorbyl stearate, etc.) It has 3-pyrazolidone and the indan -1 of a certain kind, the 3-dione; chromanol, etc. (tocopherol etc.). As an especially desirable reducing agent, they are a bisphenol and the chromanol.

[0083] The reducing agent of this invention may be added by what kind of approaches, such as a solution, powder, and a solid-state particle distribution object. Solid-state particle distribution is performed by well-known detailed-sized means (for example, a ball mill, a vibration ball mill, a sand mill, a colloid mill, a jet mill, a roller mill, etc.). Moreover, a distributed assistant may be used in case solid-state particle distribution is carried out.

[0084] Optical density may become high when the additive known as a "color tone agent" which raises an image is included. Moreover, a color tone agent may become advantageous also when making a black silver image form. A color tone agent has 0.1 - 50% (mol) of desirable \*\*\*\* rare \*\*\*\*\* per one mol of silver to the field which has an image formation layer, and being contained 0.5 to 20% (mol) is still more desirable. Moreover, a color tone agent may be the so-called precursor induction-sized so that it might have a function effectively only at the time of development.

[0085] In the heat developing record ingredient using organic silver salt a wide range color tone agent JP,46-6077,A, 47-10282, 49-5019, 49-5020, 49-91215, 49-91215, 50-2524, 50-32927, 50-67132, 50-67641, 50-114217, 51-3223, 51-27923, 52-14788, 52-99813, 53-1020, 53-76020, 54-156524, 54-156525, 61-183642, JP,4-56848,A, JP,49-10727,B, 54-20333 and a U.S. Pat. No. 3,080,254 number -- said -- No. 3,446,648 -- said -- No. 3,782,941 -- said -- No. 4,123,282 -- said -- it is indicated by No. 4,510,236, British JP,1380795,B, Belgium JP,841910,B, etc. The example of a color tone agent A phthalimide and an N-hydroxy phthalimide; succinimide, Pyrazoline-5-ON and chinae-cortex

ZORINON, 3-phenyl-2-pyrazoline-5-ON, Annular imide like 1-phenylurazole, quinazoline and 2, and 4-thiazolidinedione; North America Free Trade Agreement RUIMIDO ; A cobalt complex (For example, N-hydroxy - 1, 8-North America Free Trade Agreement RUIMIDO) (For example, cobalt hexamine trifluoroacetate); 3-mercapto - 1, 2, 4-triazole, 2, a 4-dimercapto pyrimidine, 3-mercapto - 4 Five -- Diphenyl - Mercaptan; N-(aminomethyl) aryl dicarboxyimide illustrated by 1, 2, and 4-triazole and 2,5-dimercapto-1,3,4-thiadiazole (for example), (N and N-dimethyl aminomethyl) A phthalimide, and N, N - (dimethyl aminomethyl)- Naphthalene -2, 3-dicarboxyimide; and a blocking pyrazole, isothiuronium derivative and a photofading agent (for example, N and N'-hexa methylenebis (the 1-carbamoyl -3, 5-dimethylpyrazol) --) of a certain kind 1, 8- A screw (3, 6-diaza octane) (Isothiuronium trifluoroacetate) And 2-tribromomethyl sulfonyl-(benzothiazole); and the 3-ethyl-5 [(3-ethyl-2-benzothiazolinyldene) - 1-methylethylidene]-2-thio -2, 4-oxazolidinedione; Phthalazinone, A phthalazinone derivative, a metal salt, or 4-(1-naphthyl) phthalazinone, Derivatives, such as 6-chloro phthalazinone, 5, and 7-dimethoxy phthalazinone and 2, 3-dihydro-1, and 4-phthalazine dione; Phthalazinone and a phthalic-acid derivative (For example, combination with a phthalic acid, 4-methyl phthalic acid, 4-nitro phthalic acid, tetra-chloro phthalic anhydride, etc.); Phthalazine, A phthalazine derivative, a metal salt, or 4-(1-naphthyl) phthalazine, Derivatives, such as 6-chloro phthalazine, 5, and 7-dimethoxy phthalazine and 2, and 3-dihydrophthalazine; Phthalazine and a phthalic-acid derivative (For example, combination with a phthalic acid, 4-methyl phthalic acid, 4-nitro phthalic acid, tetra-chloro phthalic anhydride, etc.); Quinazoline dione, Benzoxadine or a naphth oxazine derivative; The rhodium complex which functions also as a source of the halide ion for silver halide generation on that spot only as a color tone modifier, for example, hexa chloro rhodium (III) acid ammonium and bromination -- a rhodium -- A nitric-acid rhodium, a hexa chloro rhodium (III) acid potassium, etc.; An inorganic peroxide and persulfate, For example, peroxidation 2 ammonium sulfide and a hydrogen peroxide; 1,3-benzoxadine-2,4-dione, Benzoxadine-2,4-dione, such as 8-methyl-1,3-benzoxadine-2,4-dione and 6-nitro-1,3-benzoxadine-2,4-dione; A pyrimidine and dissymmetry-triazine For example, (2,4-dihydroxypyrimidine, a 2-hydroxy-4-amino pyrimidine), etc., azaauracil and a tetra-azapentalene derivative (for example, 3 and 6-dimercapto - 1, 4-diphenyl-1H, 4H-2, 3a and 5, and 6a-tetra-azapentalene --) And there are 1, 4-JI (o-chlorophenyl) - 3, 6-dimercapto-1H, 4H-2, 3a and 5, 6a-tetra-azapentalene, etc.

[0086] The color tone agent of this invention may be added by what kind of approaches, such as a solution, powder, and a solid-state particle distribution object. Solid-state particle distribution is performed by well-known detailed-sized means (for example, a ball mill, a vibration ball mill, a sand mill, a colloid mill, a jet mill, a roller mill, etc.). Moreover, a distributed assistant may be used in case solid-state particle distribution is carried out.

[0087] The thing of arbitration can be chosen from the nature or synthetic resin known well, for example, gelatin, a polyvinyl acetal, polyvinyl chloride, polyvinyl acetate, cellulose acetate, polyolefine, polyester, polystyrene, a polyacrylonitrile, a polycarbonate, etc. as a binder of the image formation layer in this invention. Though natural, a copolymer and a terpolymer are also contained. A desirable polymer is a polyvinyl-butyril, butyl ethyl cellulose, methacrylate copolymer, maleic-anhydride ester copolymer, polystyrene, and butadiene-styrene copolymer. It can be used if needed, combining these polymers two sorts or more than it. Such a polymer is used in sufficient amount to hold a component in it. Namely, it is used in the range effective for functioning as a binder. This contractor can determine the effective range appropriately. As a standard in the case of holding organic silver salt at least, the rate of binder pair organic silver salt has the desirable range of 15:1-1:2, especially 8:1-1:1.

[0088] moreover, the polymeric latex which describes at least one of the image formation layers of this invention below -- more than 50wt% of all binders -- you may be the image formation layer to contain. (The polymeric latex which uses this image formation layer for "the image formation layer of this invention" and a binder henceforth is expressed as "the polymeric latex of this invention".) however, the "polymeric latex" said here -- water -- an insoluble hydrophobic polymer distributes in a water-soluble dispersion medium as a detailed particle. Any are sufficient as that by which the polymer is emulsified in the dispersion medium as a distributed condition, the thing by which the emulsion polymerization was carried out, the thing by which micell distribution was carried out, or the thing which the chain itself



shape[ of a molecule ]-distributed with hydrophilicity-structure partially in the polymer molecule. In addition, the polymeric latex of this invention is indicated by "a synthetic-resin emulsion (back Tabira, the Inagaki \*\*\*\*\* , macromolecule publication meeting issue (1978))", "application (Takaaki Sugimura, Yasuo Kataoka, Soichi Suzuki, Keiji Kasahara edit, macromolecule publication meeting issue (1993)) of a synthetic latex", "the chemistry (Soichi Muroi work, macromolecule publication meeting issue (1970)) of a synthetic latex etc.", etc. The mean particle diameter of a particulate material has the more preferably desirable range of about 5-1000nm 1-50000nm. About the particle size distribution of a particulate material, there is especially no limit and a thing with large particle size distribution may also have mono dispersion particle size distribution.

[0089] As polymeric latex of this invention, the so-called latex of a core/shell mold is sufficient except the polymeric latex of the usual homogeneity structure. In this case, a core and shell may be desirable if glass transition temperature is changed.

[0090] The minimum film forming temperature (MFT) of the polymeric latex of this invention has 0 degree C - more preferably desirable about 70 degrees C -30 degrees C - 90 degrees C. In order to control minimum film forming temperature, a film formation assistant may be added. A film formation assistant is the organic compound (usually organic solvent) to which it is also called a plasticizer and the minimum film forming temperature of polymeric latex is reduced, for example, is indicated by the above-mentioned "the chemistry (Soichi Muroi work, macromolecule publication meeting issue (1970)) of a synthetic latex."

[0091] As a polymer kind used for the polymeric latex of this invention, acrylic resin, vinyl acetate resin, polyester resin, polyurethane resin, rubber system resin, vinyl chloride resin, vinylidene chloride resin, polyolefin resin, or these copolymers exist. The polymer over which the bridge was constructed is sufficient also as the polymer which branched [ the polymer of a straight chain, or ] as a polymer. Moreover, the so-called homopolymer in which the monomer single as a polymer carried out the polymerization is sufficient, and the copolymer which carried out the polymerization is sufficient as two or more sorts of monomers. In the case of a copolymer, a random copolymer or a block copolymer is sufficient. the molecular weight of a polymer -- number average molecular weight -- 5000-1 million -- 10000 to about 100000 are preferably desirable. That which that whose molecular weight is too small has the inadequate dynamics reinforcement of an image formation layer, and is too large does not have bad desirable film production nature.

[0092] Less than [ 2wt% ] and that it is as follows [ 1wt% ] more preferably have [ the polymer of the polymeric latex used for this invention ] the desirable equilibrium moisture content in 25-degree-C60% RH. Although there is especially no limit in the minimum of equilibrium moisture content, 0.01wt(s)% is desirable and is 0.03wt(s)% more preferably. About a definition and measuring method of equilibrium moisture content, it can refer to "the macromolecule engineering lecture 14, the polymeric-materials examining method (edited by Society of Polymer Science, Japan, Chijin Shokan), etc.", for example.

[0093] There is the following as an example of the polymeric latex used as a binder of the image formation layer of the heat developing image recording ingredient of this invention. The latex of methyl methacrylate / ethyl acrylate / methacrylic-acid copolymer, the latex of methyl methacrylate / 2-ethylhexyl acrylate / styrene / acrylic-acid copolymer, the latex of styrene / butadiene / acrylic-acid copolymer, the latex of styrene / butadiene / divinylbenzene / methacrylic-acid copolymer, the latex of methyl methacrylate / vinyl chloride / acrylic-acid copolymer, the latex of a vinylidene chloride / ethyl acrylate / acrylonitrile / methacrylic-acid copolymer, etc. Moreover, marketing is also carried out and such a polymer can use the following polymers. 46583 For example, a cevian A-4635, 4601 (above Daicel Chemical Industries, Ltd. make), as an example of acrylic resin As polyester resin, Nipol Lx 811, 814, 821, 820, and 857 (above Nippon Zeon Co., Ltd. make) etc. FINETEX ES 650, 611, 675, and 850 (above product made from Dainippon Ink Chemistry), As polyurethane resin, WD-size, WMS (above made in Eastman Chemical), etc. HYDRAN AP 10, 20, 30, and 40 (above product made from Dainippon Ink Chemistry) etc., As rubber system resin, LACSTAR(s) 7310K, 3307B, and 4700H, 7132C (above product made from Dainippon Ink Chemistry), Nipol Lx 416, 410, and 438C, As vinyl chloride resin (above Nippon Zeon Co., Ltd. make), 2507 etc. G351, G576 (above Nippon Zeon Co.,

Ltd. make), etc., As vinylidene chloride resin, L502, L513 (above Asahi Chemical Industry Co., Ltd. make), etc. can mention CHEMIPEARL S120 and SA100 (above product made from Mitsui Petrochemistry) etc. as olefine resin. These polymers may be used independently, if needed, may be blended two or more sorts and may be used.

[0094] Although the above-mentioned polymeric latex is preferably used as more than 50wt% of all binders, as for the image formation layer of this invention, it is more desirable that the above-mentioned polymeric latex is used as more than 70wt%.

[0095] In the image formation layer of this invention, hydrophilic polymers, such as gelatin, polyvinyl alcohol, methyl cellulose, hydroxypropylcellulose, a carboxymethyl cellulose, and hydroxypropyl methylcellulose, may be added in [ of all binders ] not more than 50wt% if needed. As for the addition of these hydrophilic polymers, less than [ of all the binders of an image formation layer / 30wt% ] is desirable.

[0096] It can dry after applying the coating liquid of a drainage system, and the image formation layer of this invention can be prepared. However, the "drainage system" said here means that more than 30wt% of the solvent (dispersion medium) of coating liquid is water. Components other than the water of coating liquid can use the organic solvent of water miscibilities, such as methyl alcohol, ethyl alcohol, isopropyl alcohol, methyl Cellosolve, ethyl Cellosolve, dimethylformamide, and ethyl acetate. There are the following things besides water as an example of a concrete solvent presentation. Water / methanol =90/10, water / methanol =70/30, water / ethanol =90/10, water / isopropanol =90/10, water/dimethylformamide = 95/5, water / methanol / dimethylformamide =80/15/5, water / methanol / dimethylformamide =90/5/5. (However, a figure expresses wt%.) The approach of a publication can also be used for a U.S. Pat. No. 5,496,695 number again.

[0097] the total amount of binders of the image formation layer of this invention -- 0.2 - 30 g/m<sup>2</sup> -- the range of 2 is more preferably desirable 1-15m. In the image formation layer of this invention, the surfactant for the cross linking agent for bridge formation and spreading nature amelioration etc. may be added.

[0098] When it sticks to a silver halide particle as sensitizing dye in this invention, as long as it can carry out the spectral sensitization of the silver halide particle and is in a desired wavelength field, what kind of thing may be used. As sensitizing dye, cyanine dye, merocyanine coloring matter, complex cyanine dye, complex merocyanine coloring matter, Jolo Pau Ra cyanine dye, styryl coloring matter, a hemicyanine dye, oxo-Norian coloring matter, hemi oxo-Norian coloring matter, etc. can be used. The useful sensitizing dye used for this invention is indicated by the reference indicated or quoted by for example, the RESEARCH DISCLOSURE Item17643 IV-A term (1978 year 12 month p.23) and this Item1831X term (1979 year 8 month p.437). The sensitizing dye which has the spectral sensitivity which was especially suitable for the spectral characteristic of the light source of various laser imagers, a scanner, an imagesetter, or a process camera can be chosen advantageously.

[0099] As an example of the spectral sensitization to red light, the so-called red light sources, such as helium-Ne laser, red semiconductor laser, and LED, are received. The compound of I-1 to I-38 given in JP,54-18726,A, the compound of I-1 to I-35 given in JP,6-75322,A, and the compound of I-1 to I-34 given in JP,7-287338,A, The compound of I-1 to I-37 given in coloring matter 1-20 given in JP,55-39818,B and JP,62-284343,A, the compound of I-1 to I-34 given in JP,7-287338,A, etc. are chosen advantageously.

[0100] To the semiconductor laser light source of a 750-1400nm wavelength field, sensitization can be advantageously carried out in spectrum with the various known coloring matter containing cyanine, merocyanine, styryl, a hemicyanine, oxo-Norian, hemi oxo-Norian, and xanthene coloring matter. Useful cyanine dye is cyanine dye which has basic nuclei, such as for example, a thiazoline nucleus, an oxazoline nucleus, a pyrroline nucleus, a pyridine nucleus, an oxazole nucleus, a thiazole nucleus, a selenazole nucleus, and an imidazole nucleus. In addition to the above-mentioned basic nucleus, a desirable thing also contains acid nuclei, such as a thiohydantoin nucleus, a rhodanine nucleus, an oxazolidinedione nucleus, a thiazoline dione nucleus, a barbituric acid nucleus, a thiazolinone nucleus, a MARONO nitril nucleus, and a pyrazolone nucleus, with a useful merocyanine color. In above-

mentioned cyanine and merocyanine coloring matter, especially the thing that has an imino group or a carboxyl group is effective. for example, a U.S. Pat. No. 3,761,279 number -- said -- No. 3,719,495 -- said -- No. 3,877,943 and British JP,1,466,201,B -- said -- No. 1,469,117 -- said -- you may choose from known coloring matter which was indicated by No. 1,422,057, JP,3-10391,B, 6-52387, JP,5-341432,A, 6-194781, and 6-301141 suitably.

[0101] Especially a desirable thing as structure of the coloring matter used for this invention the cyanine dye (as an example -- JP,62-58239,A --) which has a thioether joint content substituent 3-138638, 3-138642, 4-255840, 5-72659, 5-72661, 6-222491, 2-230506, 6-258757, 6-317868, The coloring matter indicated by 6-324425, Patent Publication Heisei No. 500926 [ seven to ], and the U.S. Pat. No. 5,541,054 number, the coloring matter (as an example -- JP,3-163440,A --) which has a carboxylic-acid radical The coloring matter indicated by No. 301141 [ six to ], and the U.S. Pat. No. 5,441,899 number, merocyanine coloring matter, polykaryotic merocyanine coloring matter, and polykaryotic cyanine dye (JP,47-6329,A --) 49-105524, 51-127719, 52-80829, 54-61517, 59-214846, 60-6750, The coloring matter indicated by 63-159841, JP,6-35109,A, 6-59381, 7-146537, 7-146537, Patent Publication Heisei No. 50111 [ 55 to ], British JP,1,467,638,B, and the U.S. Pat. No. 5,281,515 number is mentioned.

[0102] Moreover, the coloring matter of example 5 publication of a U.S. Pat. No. 5,510,236 number and said 3,871,887 numbers, JP,2-96131,A, and JP,59-48753,A are indicated as coloring matter which forms J-band, and it can use for this invention preferably.

[0103] These sensitizing dye may be used independently, may be combined two or more sorts and may be used. The combination of sensitizing dye is often especially used for the purpose of a strong color sensitizing. You are the matter which does not absorb substantially the coloring matter or the light which does not have a spectral sensitization operation in itself with sensitizing dye, and the matter in which a strong color sensitizing is shown may also be included in an emulsion. the matter in which the combination and strong color sensitizing of useful sensitizing dye and the coloring matter in which a strong color sensitizing is shown are shown -- Research Disclosure176 volume 17643 (December, 1978 issue) -- the 23rd page is indicated by J term of IV or JP,49-25500,B, 43-4933, JP,59-19032,A, 59-192242, etc.

[0104] The sensitizing dye used for this invention may use two or more sorts together. In order to make sensitizing dye add in a silver halide emulsion May distribute them in a direct emulsion and Or water, a methanol, Ethanol, propanol, an acetone, methyl Cellosolve, 2, 2 and 3, 3-tetrafluoro propanol, It may dissolve in independent or the mixed solvent of solvents, such as 2, 2, and 2-trifluoro ethanol, 3-methoxy-1-propanol, 3-methoxy-1-butanol, 1-methoxy-2-propanol, and N.N-dimethylformamide, and you may add to an emulsion.

[0105] Moreover, as indicated by the U.S. Pat. No. 3,469,987 number specification etc. Dissolve coloring matter in an volatile organic solvent, and this solution is distributed in water or hydrophilic colloid. As indicated by the approach of adding this distributed object into an emulsion, JP,44-23389,B, 44-27555, 57-22091, etc. How to dissolve coloring matter in an acid, to add this solution in an emulsion, or make an acid or a base live together, and add into an emulsion as a water solution, How to add in an emulsion what the surfactant was made to live together and was used as the water solution or the colloidal dispersion object as indicated by the U.S. Pat. No. 3,822,135 number, this No. 4,006,025 specification, etc., As coloring matter is directly distributed in hydrophilic colloid as indicated by JP,53-102733,A and 58-105141, and indicated by the approach and JP,51-74624,A which add the distributed object in an emulsion Coloring matter can be dissolved using the compound which carries out a red shift, and the approach of adding this solution into an emulsion can also be used. Moreover, a supersonic wave can also be used for the dissolution.

[0106] emulsion preparation in which it is accepted that the stage to add the sensitizing dye used for this invention in the silver halide emulsion of this invention is useful until now -- what kind of -- it may be in process. For example, as indicated by specifications, such as a U.S. Pat. No. 2,735,766 number, said 3,628,960 numbers, said 4,183,756 numbers, said 4,225,666 numbers, JP,58-184142,A, and 60-196749 the particle formation process of a silver halide or/and the stage before demineralization, and demineralization -- as indicated by specifications, such as a stage from after in process and/or

demineralization to before initiation of chemical ripening, and JP,58-113920,A After just before chemical ripening or a stage in process, and chemical ripening, as long as it becomes before the emulsion of the stage to spreading is applied, it may be added in what kind of stage and a process. moreover, it is indicated by specifications, such as a U.S. Pat. No. 4,225,666 number and JP,58-7629,A, -- as -- the same compound -- independent -- it is -- or the compound of different-species structure -- combining -- for example, the inside of a particle formation process and chemical ripening -- it may divide after in process or chemical-ripening completion, or before chemical ripening or the class of combination of the compound which may divide after completion as it is in process, may divide, may add, divides, and is added, and a compound may be changed, and you may add.

[0107] Although it is good in a desired amount to compensate for engine performance, such as sensibility and fogging, as amount of the sensitizing dye used in this invention, 10-6-1 mol per one mol of silver halides of an image formation layer is desirable, and 10-4 to ten - one mol is still more desirable.

[0108] The silver halide emulsion or/and the organic silver salt in this invention are further protected by a fogging inhibitor, a stabilizer, and the stabilizer precursor to generation of additional fogging, and can be stabilized to the fall of the sensibility under inventory storage with them. Independent or the suitable fogging inhibitor which can be combined and used, a stabilizer, and a stabilizer precursor A thia ZONIUMU salt given in U.S. Pat. No. 2,131,038 and 2,694,716, An aza-indene given in U.S. Pat. No. 2,886,437 and 2,444,605, Mercury salt given in U.S. Pat. No. 2,728,663, urazole given in U.S. Pat. No. 3,287,135, A sulfo catechol given in U.S. Pat. No. 3,235,652, the oxime of a British patent [ No. 623,448 ] publication, Nitrone, nitroindazole, polyvalent metallic salt given in U.S. Pat. No. 2,839,405, Palladium given in a thiuronium salt, U.S. Pat. No. 2,566,263, and 2,597,915 given in U.S. Pat. No. 3,220,839, A halogenation organic compound given in platinum and gold salt, U.S. Pat. No. 4,108,665, and 4,442,202, The phosphorus compounds of a publication etc. are in triazine and U.S. Pat. No. 4,411,985 given in U.S. Pat. No. 4,128,557 and 4,137,079, No. 4,138,365, and 4,459,350.

[0109] The fogging inhibitor preferably used for this invention is an organic halogenide, for example, a compound which is indicated by JP,50-119624,A, 50-120328, 51-121332, 54-58022, 56-70543, 56-99335, 59-90842, 61-129642, 62-129845, JP,6-208191,A, 7-5621, 7-2781, 8-15809, U.S. Pat. No. 5340712, said 5369000 numbers, and said 5464737 numbers is mentioned.

[0110] The fogging inhibitor of this invention may be added by what kind of approaches, such as a solution, powder, and a solid-state particle distribution object. Solid-state particle distribution is performed by well-known detailed-sized means (for example, a ball mill, a vibration ball mill, a sand mill, a colloid mill, a jet mill, a roller mill, etc.). Moreover, a distributed assistant may be used in case solid-state particle distribution is carried out.

[0111] Although it is not required in order to carry out this invention, it is sometimes advantageous to add mercury(II) salt to the emulsion layer which is an image formation layer as a fogging inhibitor. Mercury(II) salt desirable for this purpose is mercury acetate and a mercury bromide. per [ which was applied as an addition of the mercury used for this invention ] one mol of silver -- desirable -- 1n mol -1 -- m mols are the range of 10nmol - 100micro mol still more preferably.

[0112] The heat developing record ingredient in this invention may contain benzoic acids for the purpose of high-sensitivity-izing or fogging prevention. Although what kind of benzoic-acid derivative is sufficient as the benzoic acids of this invention, as an example of desirable structure, the compound of a publication is mentioned to a U.S. Pat. No. 4,784,939 number, said 4,152,160 numbers, Japanese Patent Application No. No. 151242 [ eight to ], 8-151241, 8-98051, etc. Although the benzoic acids of this invention may be added to what kind of part of a record ingredient, it is desirable to add in the layer of the field which has an image formation layer as an addition layer, and it is still more desirable to add in an organic silver salt content layer. Although what kind of process at the time of organic silver salt preparation to the time of coating liquid preparation is sufficient when you may carry out at what kind of process of coating liquid preparation as an addition stage of the benzoic acids of this invention and it adds in an organic silver salt content layer, just before [ after organic silver salt preparation to ] spreading is desirable. As an addition method of the benzoic acids of this invention, you may carry out

by what kind of approaches, such as powder, a solution, and a particle distribution object. Moreover, you may add as a solution mixed with other additives, such as sensitizing dye, a reducing agent, and a color tone agent. Although what kind of amount is sufficient as an addition of the benzoic acids of this invention, two mols or less are desirable more than 1 micro mol per one mol of silver, and less than [ more than 1m mol 0.5 mol ] is still more desirable.

[0113] In order to raise the shelf life before and behind development, a mercapto compound, a disulfide compound, and a thione compound can be made to contain, in order to make this invention control or promote development, to control development and to raise spectral sensitization effectiveness.

[0114] Although the thing of what kind of structure may be used when using a mercapto compound for this invention, what is expressed with Ar-SM and Ar-S-S-Ar is desirable. M is a hydrogen atom or an alkali-metal atom among a formula, and Ar is the ring radical or fused aromatic ring radical which has one or more nitrogen, sulfur, oxygen, seleniums, or tellurium atoms. Preferably, the complex ring in these radicals is a benzimidazole NAFUSU imidazole, benzothiazole, naphthothiazole, benzoxazole, NAFUSU oxazole, benzoselenazole, benzotellurazole, an imidazole, oxazole, a pyrazole, triazole, thiadiazole, tetrazole, triazine, a pyrimidine, pyridazine, pyrazine, a pyridine, a pudding, a quinoline, or chinae-cortex ZORINON. This complex ring may have what is chosen from the substituent group which consists of a halogen (for example, Br and Cl), hydroxy \*\* amino, carboxy, alkyl (for example, one or more carbon atoms, the thing which has 1-4 carbon atoms preferably), and alkoxy (for example, one or more carbon atoms, the thing which has 1-4 carbon atoms preferably) one. a mercapto permutation complex aromatic compound -- \*\*, if it carries out 2-mercaptobenzimidazole, 2-mercapto benzoxazole, 2-mercaptobenzothiazole, 2-mercapto-5-methylbenzimidazol, 6-ethoxy-2-mercaptobenzothiazole, 2, and 2'-dithio screw-benzothiazole, 3-mercapto - 1, 2, 4-triazole, 4, a 5-diphenyl-2-imidazole thiol, 2-mercaptoimidazole, 1-ethyl-2-mercaptobenzimidazole, 2-mercapto quinoline, 8-6 mercaptopurine, 2-mercapto-4(3H)-chinae-cortex ZORINON, A 7-trifluoromethyl-4-quinoline thiol, 2, 3 and 5, a 6-tetra-chloro-4-pyridine thiol, A 4-amino-6-hydroxy-2-mercaptopyrimidine MONOHIDO rate, 2-amino-5-mercapto - 1, 3, 4-thiadiazole, 3-amino-5-mercapto - 1, 2, 4-triazole, 4-HIDOKIROSHI-2-mercaptopyrimidine, 2-mercaptopyrimidine, 4, 6-diamino-2-mercaptopyrimidine, 2-mercapto-4-methylpyrimidine hydrochrolide, 3-mercapto-5-phenyl - Although 1, 2, 4-triazole, 2-mercapto-4-phenyl oxazole, etc. are mentioned This invention is not limited to these.

[0115] The range of 0.001-1.0 mols per one mol of silver is 0.01-0.3 mols per mol in silver amount desirable still more preferably in the emulsion layer which is an image formation layer as an addition of these mercapto compounds.

[0116] A nucleating accelerator which promotes an operation of a nucleating agent may also be included in the heat developing record ingredient of this invention.

[0117] As a nucleating accelerator used for this invention, an amine derivative, onium salt, a disulfide derivative or a hydroxymethyl derivative, a hydroxamic acid derivative, acyl hydrazide derivative, an acrylonitrile derivative, a hydrogen donor, etc. are mentioned. The examples are enumerated below. With the compound of a page [ of JP,7-77783,A / 48 / of - of two lines 37 lines ] publication, it is specifically the compound A -one to A-73 of a 49 pages - 58 pages publication. the (\*\* 21) given in JP,7-84331,A, and (\*\* 22) (\*\* 23) the compound expressed -- concrete -- page [ of the said official report ] 6 - the compound of a 8-page publication. the compound expressed with the general formula [Na] and general formula [Nb] of a publication to JP,7-104426,A -- concrete -- page [ of the said official report ] 16 - the compound of Na-1-Na-22 of a 20-page publication, and the compound of Nb-1-Nb-12. With the compound expressed [ Japanese Patent Application No. / No. 37817 / seven to ] with the general formula (1), the general formula (2), the general formula (3), the general formula (4), the general formula (5), general formula (6), and general formula (7) of a publication Specifically, they are the compound of 1-1 to 1-19 given in this specification, the compound of 2-1 to 2-22, the compound of 3-1 to 3-36, the compound of 4-1 to 4-5, the compound of 5-1 to 5-41, the compound of 6-1 to 6-58, and the compound of 7-1 to 7-38. A nucleating accelerator given in Japanese Patent Application No. No. 70908 [ eight to ].

[0118] The nucleating accelerator of this invention can be dissolved and used for water or a suitable

organic solvent (a methanol, ethanol, propanol, fluorination alcohol), for example, alcohols, ketones (an acetone, methyl ethyl ketone), dimethylformamide, dimethyl sulfoxide, methyl Cellosolve, etc.

[0119] Moreover, with the emulsification variational method already known well, it can dissolve using auxiliary solvents, such as oil, such as dibutyl phthalate, tricresyl phosphate, glyceryl triacetate, or diethyl phthalate, ethyl acetate, and a cyclohexanone, and an emulsification distribution object can be produced and used mechanically. Or by the approach learned as a solid-state variational method, into water, a ball mill, a colloid mill, or a supersonic wave can distribute, and the powder of a nucleating accelerator can be used.

[0120] Although you may add to a base material in any layer of the layer by the side of an image formation layer, i.e., an image formation layer, and other binder layers, as for the nucleating accelerator of this invention, it is desirable to add in the binder layer which adjoins an image formation layer or it.

[0121] The addition of the nucleating accelerator of this invention has desirable  $1 \times 10^{-6}$  to  $2 \times 10^{-5}$  - one mol to one mol of silver, its  $1 \times 10^{-5}$  to  $2 \times 10^{-4}$  - two mols are more desirable, and its  $2 \times 10^{-5}$  to  $1 \times 10^{-4}$  - two mols are the most desirable.

[0122] A fatty acid given in polyhydric alcohol (for example, the glycerol and diol of a class which were indicated by U.S. Pat. No. 2,960,404), U.S. Pat. No. 2,588,765, and 3,121,060 or ester, the silicone resin of a British patent [ No. 955,061 ] publication, etc. can be used for the image formation layer in this invention as a plasticizer and lubricant.

[0123] The heat developing record ingredient in this invention can prepare a surface protective layer for the purpose, such as antisticking of an image formation layer.

[0124] Although what kind of polymer is sufficient as a binder of the surface protective layer of this invention, it is desirable that the polymer which has carboxylic-acid residue is included two or less or more [ 100mg //m ] 25 g/m. As a polymer which has carboxyl residue here, naturally-occurring polymers (gelatin, alginic acid, etc.), denaturation naturally-occurring polymers (a carboxymethyl cellulose, FUTARU-ized gelatin, etc.), synthetic macromolecules (polymethacrylate, polyacrylate, poly alkyl methacrylate / acrylate copolymer, polystyrene / polymethacrylate copolymer, etc.), etc. are mentioned. It is desirable that it is 10 or more mmols [ per polymer 100g ] 1.4 mols or less as a content of the carboxy residue of such a polymer. Moreover, carboxylic-acid residue may form alkali-metal ion, alkaline earth metal ion, an organic cation, etc. and a salt.

[0125] What kind of antisticking ingredient may be used as a surface protective layer of this invention. As an example of an antisticking ingredient, a wax, a silica particle, a styrene content elastomeric block copolymer (for example, styrene-styrene butadiene rubber, styrene-isoprene-styrene), cellulose acetate, cellulose acetate butylate, cellulose propionate, such mixture, etc. exist. Moreover, to a surface protective layer, the surfactant for the cross linking agent for bridge formation and spreading nature amelioration etc. may be added.

[0126] Light absorption matter and a filter color which are indicated by U.S. Pat. No. 3,253,921, 2,274,782, 2,527,583, and 2,956,879 can be used for the protective layer of the image formation layer in this invention, or an image formation layer. Moreover, a color can be mordanted, for example like a publication to U.S. Pat. No. 3,282,699. As amount of the filter color used, 0.1-3 have a desirable absorbance in exposure wavelength, and 0.2-especially 1.5 are desirable.

[0127] The polymer bead which contains in the protective layer of the image formation layer in this invention or an image formation layer the bead of the class indicated by a flatting agent, for example, starch, a titanium dioxide, a zinc oxide, a silica, U.S. Pat. No. 2,992,101, and 2,701,245 can be contained. Moreover, although the method of \*\*\*\* is sufficient as whenever [ mat / of an emulsion side ] if stardust failure does not arise, 10000 or less seconds has the desirable Beck smoothness 200 seconds or more, and 10000 or less seconds is desirable especially 300 seconds or more.

[0128] The emulsion for heat developing photographs of this invention serves as 1 on a base material, or a constituent of the layer beyond it. Much more configuration must contain the ingredient of the addition by the request of organic silver salt, a silver halide, a developer, a binder and a color tone agent, a covering assistant, other adjuvants, etc. The configuration of a bilayer must contain some of other components in the 2nd layer or both layers including organic silver salt and a silver halide in the 1st



emulsion layer (layer which usually adjoined the base material). However, the configuration of the bilayer which comes to contain the single emulsion layer and protection topcoat containing all components is also considered. The configuration of a multicolor photosensitivity heat developing photograph ingredient may contain all components in the monolayer as you may include the combination of these bilayers about each color and it is indicated by U.S. Pat. No. 4,708,928. In the case of a charge of polychromatosis multicolor photosensitivity heat developing photograph ingredient, generally, by using the barrier layer of functionality or non-functionality between each emulsion layer (sensitization layer), each emulsion layer of each other is distinguished and is held as indicated by U.S. Pat. No. 4,460,681.

[0129] Various colors and a pigment can be used for the image formation layer of this invention from a viewpoint of color tone amelioration and irradiation prevention. Although what kind of thing is sufficient as the color and pigment which are used for the image recording layer of this invention, there are a pigment and a color given in a Color Index, for example, and organic pigments including a pyrazolo azole color, anthraquinone dye, azo dye, an azomethine color, an oxo-Norian color, a carbocyanine color, a styryl color, triphenylmethane dye, India aniline dye, indophenol dye, and a phthalocyanine, an inorganic pigment, etc. are specifically mentioned. As a desirable color used for this invention, anthraquinone dye (for example, compound 3-6-18, 3-23-38, etc.), [ the compounds 1-9 given in JP,5-341441,A and given in JP,5-165147,A ] An azomethine color (compounds 17-47 given in JP,5-341441,A etc.), India aniline dye (For example, compound 2-10-11 [ the compounds 11-19 given in JP,5-289227,A, the compound 47 given in JP,5-341441,A, and given in JP,5-165147,A ] etc.) And azo dye (compounds 10-16 given in JP,5-341441,A) is mentioned. As an addition method of these colors, what kind of approach is sufficient as the condition that mordanting was carried out to the solution, the emulsification object, the solid-state particle distribution object, and the macromolecule mordant etc. Although the amount of these compounds used is decided with the target absorbed amount, it is desirable to use in 1g or less more than 1ml micropor two g generally.

[0130] In this invention, an anti halation layer can be prepared in a side far from the light source to an image formation layer. As for an anti halation layer, it is desirable that it is desirable still more desirable that it is [ or more 0.1 ] two or less, and the maximum absorption in the wavelength range of desired is absorption of 1.5 or less or more 0.2 exposure wavelength, and the absorption in the visible region after processing is the layer in which that it is [ or more 0.001 ] less than 0.2 has or more 0.001 less than 0.15 optical density desirable still more preferably. [0131] When using an antihalation color by this invention, it may have absorption of the purpose in the wavelength range, as for such a color, there may be enough little absorption in a visible region after processing, and as long as the configuration of an absorbance spectrum with the above-mentioned desirable anti halation layer is acquired, what kind of compound is sufficient as it. For example, although the next thing is indicated, this invention is not limited to this. As an independent color, JP,59-56458,A, JP,2-216140,A, 7-13295, 7-11432, a U.S. Pat. No. 5,380,635 number publication, From the 13th page left lower column of the 1st line of JP,2-68539,A to this 14th page left lower column of the 9th line There is a compound given [ this ] in the 16th page lower right column from the 14th page left lower column of a 3-24539 official report. As a color decolorized by processing, JP,52-139136,A, 53-132334, 56-501480, 57-16060, 57-68831, 57-101835, 59-182436, JP,7-36145,A, There are 7-199409, JP,48-33692,B, 50-16648, JP,2-41734,B, a U.S. Pat. No. 4,088,497 number, said 4,283,487 numbers, said 4,548,896 numbers, and said 5,187,049 numbers.

[0132] As for the heat developing record ingredient in this invention, it is desirable that it is the so-called one side record ingredient which has at least one-layer image formation layer in one base material side, and has a back layer in an another side side.

[0133] In this invention, a mat agent may be added for conveyance nature amelioration. Generally a mat agent is organic [ of insolubility / water ], or the particle of an inorganic compound. as a mat agent -- the thing of arbitration -- it can be used -- for example, U.S. Pat. No. 1,939,213 -- said -- No. 2,701,245 -- said -- No. 2,322,037 -- said -- No. 3,262,782 -- said -- No. 3,539,344 -- said -- an organic mat agent given in each specification, such as No. 3,767,448, -- said -- No. 1,260,772 -- said -- No. 2,192,241 --

said -- No. 3,257,206 -- said -- No. 3,370,951 -- said -- No. 3,523,022 -- said -- what was known well can be used for each specification, such as No. 3,769,020, in this industry, such as an inorganic mat agent of a publication, for example, as an example of the organic compound which can specifically be used as a mat agent As an example of a water-dispersion vinyl polymerization object, polymethyl acrylate, polymethylmethacrylate, A polyacrylonitrile and acrylonitrile-alpha-methyl-styrene copolymer, Polystyrene, styrene divinylbenzene copolymer, polyvinyl acetate, As an example of a cellulosic, polyethylene carbonate, polytetrafluoroethylene, etc. Methyl cellulose, Cellulose acetate, cellulose acetate propionate, etc., Gelatin, hardening gelatin which carried out coacervate hardening and which was made into very small capsule hollow grain hardened as an example of a starch derivative with well-known curing agents, such as carboxy starch, carboxy nitrophenyl starch, and a urea-formaldehyde-starch reactant, can be used preferably. the silver chloride desensitized as an example of an inorganic compound by a silicon dioxide, a titanium dioxide, diacid-ized magnesium, the aluminum oxide, the barium sulfate, the calcium carbonate, and the well-known approach -- similarly a silver bromide, glass, diatomaceous earth, etc. can be used preferably. The above-mentioned mat agent can mix and use the matter of a class different if needed. There is especially no limitation in the magnitude of a mat agent, and a configuration, and it can use the thing of the particle size of arbitration for them. It is desirable to use a thing with a particle size of 0.1 micrometers - 30 micrometers on the occasion of operation of this invention. Moreover, the particle size distribution of a mat agent may be narrow, or may be large. On the other hand, since a mat agent influences Hayes of a paint film, and surface gloss greatly, it is desirable to change particle size, a configuration, and particle size distribution into the condition as occasion demands by mixing of the time of mat agent production or two or more mat agents.

[0134] In this invention, as whenever [ mat / of a back layer ], 250 or less seconds, 10 seconds or more are desirable still more desirable, and the Beck smoothness is 50 seconds or more 180 or less seconds.

[0135] In this invention, as for a mat agent, it is desirable to contain in the layer which functions as the outermost surface layer or the outermost surface layer of a heat developing record ingredient, or the layer near an outside surface, and it is desirable to contain in the layer which acts as the so-called protective layer.

[0136] In this invention, the binder with a suitable back layer is transparent or translucent. Generally it is colorlessness. Natural polymer synthetic resin, a polymer, and a copolymer, In addition, the medium which forms a film, for example, :gelatin, gum arabic, Pori (vinyl alcohol), hydroxyethyl cellulose, cellulose acetate, Cellulose acetate butylate, Pori (vinyl pyrrolidone), casein, Starch, Pori (acrylic acid), Pori (methyl methacrylic acid), Pori (vinyl chloride), Pori (methacrylic acid), copoly (styrene-maleic anhydride), copoly (styrene-acrylonitrile), Copoly (styrene-butadiene) and Pori (vinyl acetal) For example, (Pori (vinyl formal) and Pori (vinyl butyral)), There are Pori (ester), Pori (urethane), phenoxy resin, Pori (vinylidene chloride), Pori (epoxide), Pori (carbonate), Pori (vinyl acetate), cellulose ester, and Pori (amide). A binder may carry out covering formation from water, an organic solvent, or an emulsion.

[0137] As for a back layer, in this invention, it is desirable that it is or more 0.5 two or less absorption that the maximum absorption in the wavelength range of desired is two or less [ 0.3 or more ] desirable still more preferably, and the absorption in the visible region after processing is the layer in which that it is [ or more 0.001 ] less than 0.5 has or more 0.001 less than 0.3 optical density desirable still more preferably. Moreover, as an example of the antihalation color used for a back layer, it is the same as the above-mentioned anti halation layer.

[0138] A rear-face resistance heating layer (backside resistive heating layer) as shown in U.S. Pat. No. 4,460,681 and 4,374,921 can also be used for an image recording nature heat developing photograph system.

[0139] A hardening agent may be used for each class, such as an image formation layer of this invention, a protective layer, and a back layer. The vinyl sulfone system compounds indicated by the epoxy compounds indicated by the poly isocyanates indicated by a U.S. Pat. No. 4,281,060 number, JP,6-208193,A, etc., the U.S. Pat. No. 4,791,042 number, etc. as an example of a hardening agent, JP,62-89048,A, etc. are used.



[0140] A surfactant may be used for this invention for the purpose of spreading nature, electrification amelioration, etc. As an example of a surface active agent, anythings, such as the Nonion system, an anion system, a cation system, and a fluorine system, are used suitably. Specifically, polyalkylene oxide, an anion system surfactant, etc. of a publication are mentioned to the Pori Shiroki acid system surfactant given in a fluorochemical surfactant given in a fluorine system high molecular surface active agent given in JP,62-170950,A, a U.S. Pat. No. 5,380,644 number, etc., JP,60-244945,A, JP,63-188135,A, etc., a U.S. Pat. No. 3,885,965 number, etc., JP,6-301140,A, etc.

[0141] Although mentioned to a new edition solvent pocketbook (Ohm-Sha, 1994 annual publications) etc. as an example of the solvent used for this invention, this invention is not limited to this. Moreover, as the boiling point of the solvent used by this invention, 40-degree-C or more thing 180 degrees C or less is desirable.

[0142] As an example of the solvent of this invention, a hexane, a cyclohexane, toluene, a methanol, Ethanol, isopropanol, an acetone, a methyl ethyl ketone, ethyl acetate, 1,1,1-trichloroethane, a tetrahydrofuran, triethylamine, A thiophene, trifluoro ethanol, a perfluoro pentane, a xylene, n-butanol, a phenol, methyl isobutyl ketone, a cyclohexanone, Butyl acetate, diethyl carbonate, a chlorobenzene, dibutyl ether, an anisole, ethylene glycol diethylether, N.N-dimethylformamide, a morpholine, a propane sultone, perfluoro tributylamine, water, etc. are mentioned.

[0143] The emulsion for heat developing in this invention can be made to cover on various base materials. a typical base material -- polyester film, under coat polyester film, the Pori (ethylene terephthalate) film, a polyethylenenaphthalate film, a nitric-acid cellulose film, a cellulose ester film, the Pori (vinyl acetal) film, and a polycarbonate film -- and or it is related, a resin-like ingredient and glass, paper, a metal, etc. are included. A flexible base material and the paper base material the coat was especially carried out [ the base material ] by the polymer of the alpha olefin of the carbon numbers 2-10, such as a baryta paper, alpha olefin polymer [ which was acetylated partially ] especially polyethylene, polypropylene, and ethylene-butene copolymer, are used typically. A transparent thing is desirable, although the base material may be transparent or it may be opaque.

[0144] The heat developing record ingredient of this invention may have the layer which includes insoluble mineral salt like a publication etc. in the ionicity polymer or U.S. Pat. No. 3,428,451 like the publication to electrification prevention or a conductive layer (for example, a chloride, a nitrate, etc.), for example, fusibility salts, a vacuum evaporation metal layer, U.S. Pat. No. 2,861,056, and 3,206,312.

[0145] As an approach of obtaining a color picture using the heat developing sensitive material in this invention, the approach of a publication is [ 11 left columns / of the 40th line ] from the JP,7-13295,A 10 page left column of the 43rd line. Moreover, it is illustrated by the British patent No. 1,326,889, U.S. Pat. No. 3,432,300, 3,698,909, 3,574,627, 3,573,050, 3,764,337, and 4,042,394 as a stabilizer of a color color image.

[0146] The heat developing photographic emulsion in this invention can be covered with the various coating actuation including dip coating, air knife coating, flow coating, or the extrusion coating that uses the hopper of the class of publication for U.S. Pat. No. 2,681,294. Two-layer or the layer beyond it can be covered with the approach of a U.S. Pat. No. 2,761,791 and British patent [ No. 837,095 ] publication by request to coincidence.

[0147] A known primer layer etc. can be included in an opacification layer, a protection topcoat layer, and a light-and-heat photograph technique in case the color acceptance layer for receiving, additional layer, for example, migration color image, and reflective printing are desired in the heat developing record ingredient in this invention. As for the record ingredient of this invention, it is desirable that image formation can be carried out with the one ingredient, and it is desirable not to become ingredient with an another functional layer required for image formation, such as a television layer.

[0148] Although negatives may be developed by what kind of approach, the heat developing record ingredient of this invention carries out the temperature up of the record ingredient usually exposed to image WAIZU, and is developed. As desirable development temperature, it is 80-250 degrees C, and is 100-140 degrees C still more preferably. As developing time, 1 - 180 seconds is desirable, and 10 - 90

seconds is still more desirable.

[0149] Although the heat developing record ingredient of this invention may be exposed by what kind of approach, laser light is desirable as the exposure light source. As a laser light by this invention, gas laser, an YAG laser, dye laser, semiconductor laser, etc. are desirable. Moreover, semiconductor laser, a second harmonic generation component, etc. can also be used.

[0150] When the heat developing record ingredient of this invention does not contain a photosensitive silver halide, latent-image formation of the heat developing record ingredient of this invention can be carried out with heating. The approach of making the materials (a color, pigment, etc.) which absorb specific wavelength in a record ingredient and are changed into heat also by the approach of heating directly using a sensible-heat head etc. existing, and heating them indirectly may be used for heating. The light source used at this time has a desirable laser light of the above-mentioned publication.

Furthermore, it is also possible to combine these. Moreover, when carrying out latent-image formation with heating, you may have two steps of processes of forming a latent image with heating of a first stage story, and forming an image on a second stage story, and heating of a first stage story can also perform to image formation.

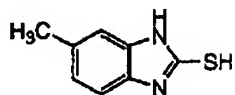
[0151]

[Example] Although an example is shown below and this invention is further explained to a detail, this invention is not limited to this. First, the structure expression of the compound used for the following examples is shown.

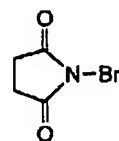
[0152]

[Formula 4]

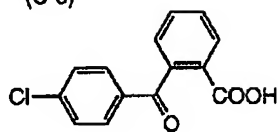
(C-1)



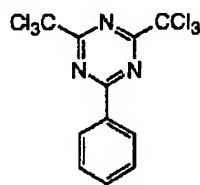
(C-2)



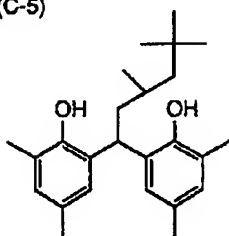
(C-3)



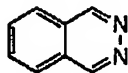
(C-4)



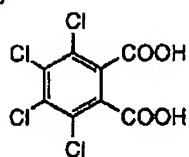
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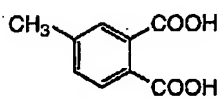
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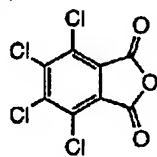
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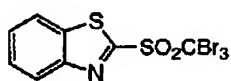
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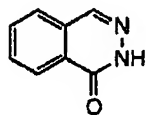
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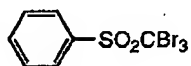
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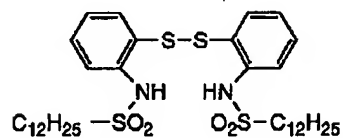
(C-11)



(C-12)



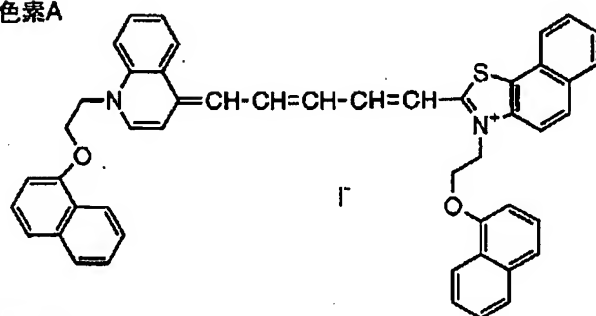
ジスルフィド化合物A



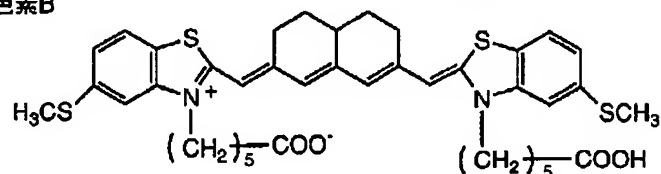
[0153]

[Formula 5]

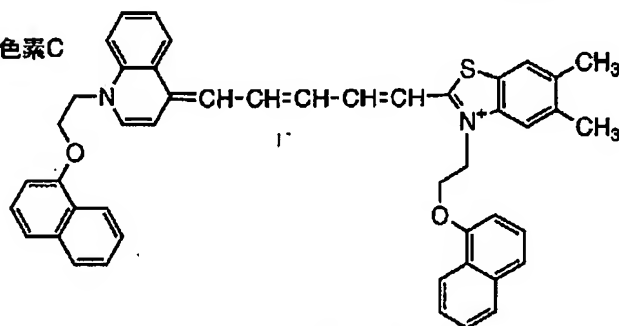
増感色素A



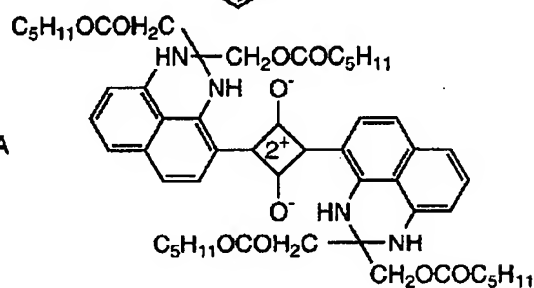
増感色素B



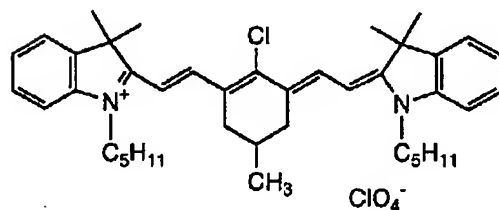
増感色素C



染料A



染料B

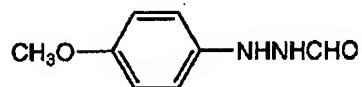


[0154]

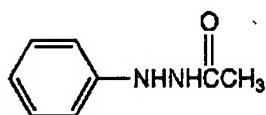
[Formula 6]

比較化合物

RF-1



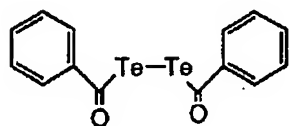
RF-2



[0155]

[Formula 7]

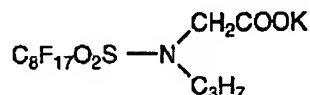
テルル化合物 1



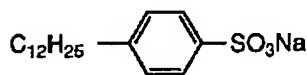
[0156]

[Formula 8]

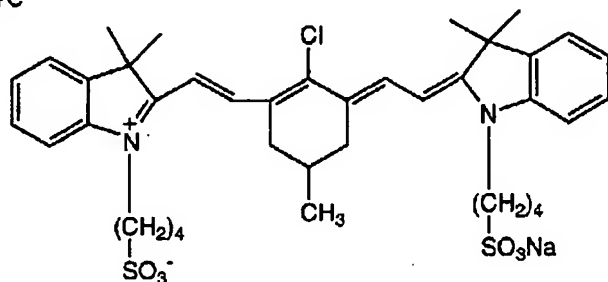
界面活性剤A



界面活性剤B



染料C



[0157] After dissolving inert gelatin 7.5g and 10mg of potassium bromides in 900ml of example -1 (preparation of the silver halide particle A) water and doubling pH with 3.0 at the temperature of 35 degrees C, keeping the water solution which contains 370ml of water solutions, potassium bromide, and potassium iodide containing 74g of silver nitrates by the mole ratio of 94:6, and contains K3 [IrCl6] at pAg7.7, with the control double jet process, it applied for 10 minutes and added. [IrCl6] 3- was added so that it might become 3xten - seven mols to one mol of silver. After that 4-hydroxy-6-methyl - 1, 3, 3a, and 7-TETORAZA indene 0.3g were added, pH was adjusted to 5 by NaOH, and the cube iodine-silver-bromide particle of average size 0.06micrometer, 8% of projected-area coefficient of variation, and 87% of {100} side ratios was obtained. Flocking settling of the gelatin flocculant was used and carried out to this emulsion, phenoxyethanol 0.1g after demineralization processing was added, and it adjusted to pH5.9 and pAg7.5.

[0158] (Preparation of the organic-acid silver emulsion A) After adding over 15 minutes and leaving 31.1ml of 1 N-NaOH water solutions as it was for 1 hour, having mixed for 15 minutes and stirring violently 10.6g of behenic acid, and 300ml of distilled water at 90 degrees C, the temperature was lowered at 30 degrees C. Next, after having added 7ml of 1N-phosphate water solutions, and adding 0.13g (C-2) of N-bromosuccinimide, stirring more violently, the silver halide particle A prepared beforehand was added so that the amount of silver halides might become 2.5m mol. Furthermore, continuation addition being carried out over 2 minutes, and stirring 25ml of 1N-silver-nitrate water solutions was continued for 90 minutes as it was. 37g of 1.2% of the weight of butyl-acetate solutions of polyvinyl acetate was added into this drainage system mixture, water was removed after forming the flocks of a distributed object, and removal of two more rinsings and water was performed. Then, it added, stirring 20g of polyvinyl butyral [ 2.5wt(s)% of ] (DENKA butyral [ by DENKI KAGAKU KOGYO K.K. ] #3000-K) butyl-acetate, and isopropyl alcohol 1:2 mixed solutions. Then, polyvinyl-butyral (DENKA butyral [ by DENKI KAGAKU KOGYO K.K. ] # 4000 -2) 7.8g and 2-butanone 57g were added into the gel organic acid obtained in this way and the mixture of a silver halide, the homogenizer distributed, and the behenic acid silver salt emulsion (needlelike particle of the average minor axis of 0.04 micrometers, the average major axis of 1 micrometer, and 30% of coefficient of variation) was obtained.

[0159] (Preparation of emulsion layer coating liquid A) Each chemical was added so that it might

become the organic-acid silver emulsion obtained above with the following amounts per one mol of silver. They are [ sensitizing dye / A / phenylthio sulfonic-acid sodium 10mg and ] 18mg, 2-mercapto-5-methyl benzimidazole (C-1) 2g, and 21.5g (C-3) of 4-chlorobenzo phenon-2-carboxylic acids about 20mg and sensitizing dye C in 25mg and sensitizing dye B at 25 degrees C. It added stirring 2-butanone 580g and dimethylformamide 220g, and was left for 3 hours. Subsequently, 4 and 6-JTORI chloromethyl-2-phenyl triazine (C-4) 4g, It isg [ 2 ], 1, and 1-screw (2-hydroxy - 3, 5-dimethylphenyl) about disulfide compound A. - 3, 5, and 5-trimethyl hexane (C-5) 170g, 5g [ of tetrachlorophthalic acid ] (C-7), and phthalazine (C-6) 15g, and megger facsimile F-176P (fluorochemical surfactant by Dainippon Ink & Chemicals, Inc.) It added stirring 1.1 g, 2-butanone 590g, and methyl-isobutyl-ketone 10g. It added agitating so that it may furthermore become an amount given [ a nucleating agent given in Table 9 ] in Table 9.

[0160] CAB171-15S (Eastman Chemical cellulose acetate butyrate)75g, (Preparation of emulsion protective layer coating liquid A) 5.7g (C-8) of 4-methyl phthalic acids, 1.5g (C-9) of tetrachlorophthalic anhydrides, Tribromomethyl sulfonyl benzene (C-12) 8g, 2-tribromomethyl sulfonyl benzothiazole (C-10) 6g, Megger facsimile F-176P [ Phthalazone / 3g and 0.3g / (C-11) ], What dissolved sill DEKKUSU H31(real ball [ by Dohkai Chemical industries Co., Ltd. ]-like silica average size 3micrometer) 2g and sumidur N3500(poly isocyanate by Sumitomo Bayer urethane company) 6g in 2-butanone 3070g and 30g of ethyl acetate was prepared.

[0161] (Creation of a base material with a back side) Polyvinyl-butylal (DENKA butylal [ by DENKI KAGAKU KOGYO K.K. ] # 4000 -2) 6g, Stirring to 2-propanol 64g, it added, and megger facsimile F-176P [ sill DEKKUSU H121 (real ball / by Dohkai Chemical industries Co., Ltd. /-like silica average size 12micrometer) 0.2g, sill DEKKUSU H51 (real ball / by Dohkai Chemical industries Co., Ltd. /-like silica average size 5micrometer) 0.2g, and 0.1g ] were dissolved and mixed. Furthermore, the mixed solution and 3-isocyanato methyl which melted the 210mg color A and the 210mg color B to methanol 10g and acetone 20g - The solution which melted 3, 5, and 5-trimethylhexyl isocyanate 0.8g to 6g of ethyl acetate was added, and coating liquid was prepared.

[0162] On the polyethylene terephthalate film with which both sides consist of a moisture-proof under coat containing a vinylidene chloride, back side coating liquid was applied so that it might become the optical density 0.7 of 780nm.

[0163] After applying emulsion layer coating liquid A on the base material prepared as mentioned above so that silver may serve as 2 g/m<sup>2</sup>, on the emulsion side, emulsion protective layer coating liquid A was applied so that it might become 5 micrometers in desiccation thickness, and the sample of a heat developing record ingredient was created.

[0164] (Exposure, development) Through the interference filter which has a peak in 780nm, it exposed through the step wedge with the xenon flash plate light of luminescence time amount 10-4sec, and processing (development) was carried out for 25 seconds at 115 degrees C, the concentration of the obtained image was measured and the characteristic curve was acquired.

[0165] (Evaluation of high contrast nature) The slope of a line which connects the point of concentration 0.3 and 3.0 was shown as gradation gamma. It is desirable that it is ten or more.

[0166] (Evaluation of a development condition dependency) The sensibility range of fluctuation deltaS1 with a development temperature of \*\*2 degrees C and the sensibility range of fluctuation deltaS2 in developing time \*\*5 seconds were measured to standard development conditions (115 degrees C, 25 seconds).

deltaS1= (117 degrees C, sensibility in 25 seconds) - (113 degrees C, sensibility in 25 seconds)

deltaS2= (115 degrees C, sensibility in 30 seconds) - (115 degrees C, sensibility in 20 seconds)

Sensibility used the opposite numeric value of the light exposure which gives concentration 1.5. It is shown that it is so stable that a value is close to 0 to fluctuation of development conditions. It is required for delta S1 and delta S2 to be 0--0.1 practical, and it is desirable that it is 0--0.05. A result is shown in Table 9.

[0167]

[Table 9]

実験 No.	造核剤		写真性能			備考
	No.	添加量(mol/m <sup>2</sup> )	ガンマ	$\Delta S1$	$\Delta S2$	
1-1	—	—	5.7	-0.04	-0.02	比較例
1-2	RF-1	$1.0 \times 10^{-5}$	6.1	-0.08	-0.04	比較例
1-3	RF-1	$1.0 \times 10^{-4}$	12.5	-0.35	-0.21	比較例
1-4	RF-2	$1.0 \times 10^{-5}$	5.3	-0.07	-0.03	比較例
1-5	RF-2	$1.0 \times 10^{-4}$	10.1	-0.32	-0.19	比較例
1-6	1a	$1.0 \times 10^{-5}$	13.2	-0.04	-0.03	本発明
1-7	11a	$1.0 \times 10^{-5}$	12.5	-0.04	-0.03	本発明
1-8	15d	$1.0 \times 10^{-5}$	13.1	-0.05	-0.02	本発明
1-9	20a	$1.0 \times 10^{-5}$	13.0	-0.04	-0.02	本発明
1-10	51	$0.5 \times 10^{-5}$	13.9	-0.06	-0.03	本発明
1-11	91	$0.5 \times 10^{-5}$	13.2	-0.06	-0.04	本発明
1-12	93	$0.5 \times 10^{-5}$	13.8	-0.07	-0.03	本発明
1-13	95	$0.5 \times 10^{-5}$	14.4	-0.07	-0.06	本発明
1-14	99	$0.5 \times 10^{-5}$	13.6	-0.06	-0.04	本発明

[0168] (Result) If the nucleating agent of this invention is used, a very stable heat developing record ingredient with small superhard tone and development condition dependency will be obtained. In addition, the sample of this invention had sensibility and sufficiently high Dmax also in which the above-mentioned development conditions.

[0169] After dissolving FUTARU-ized gelatin 22g and 30mg of potassium bromides in 700ml of example -2 (preparation of the silver halide particle B) water and doubling pH with 5.0 at the temperature of 40 degrees C, keeping 159ml of water solutions containing 18.6g of silver nitrates, and the water solution containing a potassium bromide at pAg7.7, with the control double jet process, it applied for 10 minutes and added. It added over 30 minutes with the control double jet process, keeping the water solution which contains 1., 8xten - six mols /, and a potassium bromide for K3[IrCl6]3- by 1. in one mol /at pAg7.7. It adjusted to pH5.9 and pAg8.0 after that.

[0170] The obtained particle was a cube particle of 8% of coefficient of variation of the average grain size of 0.07 micrometers, and a projected-area diameter, and 86% of rates of area (100).

[0171] The temperature up of the above-mentioned silver halide particle B was carried out to the temperature of 60 degrees C, 2, 3, 4 and 5, 6-Pentough ROROFENIRUJIFENIRUSURU fin selenide, the 2xten - six mols tellurium compound 1, 3.3xten - six mols chloroauric acid, and 2.3xten - four-mol thiocyanic acid were added, and it riped for 120 minutes. [ a 8.5xten - five mols / per one mol of silver / sodium thiosulfate and 1.1xten - five mols ] Then, it added having made temperature into 50 degrees C and stirring 8xten - four-mol sensitizing dye C, and further, the 3.5xten - two-mol potassium iodide was added, and it stirred for 30 minutes, it quenched at 30 degrees C, and preparation of a silver halide particle was completed.

[0172] (Preparation of an organic-acid silver microcrystal distribution object) 187ml of 1 N-NaOH water solutions was added over 15 minutes, having mixed for 15 minutes and stirring violently 40g of behenic acid, 7.3g of stearic acid, and 500ml of distilled water at 90 degrees C, 61ml of 1N-nitric-acid water solutions was added, and the temperature was lowered at 50 degrees C. Next, 124ml of 1N-silver-nitrate water solutions was added, and it stirred for 30 minutes as it is. Then, solid content was filtered by suction filtration, and solid content was rinsed until the conductivity of filtered water became 30microS/cm. In this way, it was dealt with as a wet cake without making it dry, and polyvinyl alcohol 12g and 150ml of water were added to the wet cake of 34.8g of desiccation solid content, it mixed well,

and obtained solid content was taken as the slurry. With an average diameter of 0.5mm zirconia-beads 840g was prepared, and it put into vessel together with the slurry, and distributed for 5 hours in the disperser (1 / 4G-Sand-grinder mill: product made from eye MEKKUSU), and the organic-acid silver microcrystal distribution object with a volume weighted average of 1.5 micrometers was obtained. Measurement of grain size is Malvern Instruments Ltd. Make It carried out in MasterSizerX.

[0173] (Preparation of a material solid-state particle distribution object) Tetrachlorophthalic acid (C-7), 4-methyl phthalic-acid (C-8), 1, and 1-screw (2-hydroxy - 3, 5-dimethylphenyl) - The solid-state particle distribution object was prepared about a 3, 5, and 5-trimethyl hexane (C-5), phthalazine (C-6), and tribromomethyl sulfonyl benzene (C-12).

[0174] To tetrachlorophthalic acid, hydroxypropylcellulose 0.81g and 94.2ml of water could be added, and it stirred, and was left as a slurry for 10 hours. Then, it distributed for 5 hours by the disperser of the same mold as what put 100ml and a slurry into vessel together, and used zirconia beads with an average diameter of 0.5mm for preparation of an organic-acid silver microcrystal distribution object, and the solid-state microcrystal distribution object of tetrachlorophthalic acid was obtained. 70wt(s)% of the grain size of a solid-state particle was 1.0 micrometers or less.

[0175] In order to obtain desired mean particle diameter about other materials, the amount used and distributed time amount of a dispersant were changed suitably, and the solid-state particle distribution object was obtained.

[0176] (Preparation of emulsion layer coating liquid B) The following class product was added to the organic-acid silver microcrystal distribution object prepared previously, and emulsion layer coating liquid B was prepared.

An organic-acid silver microcrystal distribution object 1 Mol Silver halide particle B 0.05 mols Binder: SBR latex (LACSTAR 3307B Dainippon Ink & Chemicals, Inc. make) 430g Material for development: Tetrachlorophthalic acid 5g 1 and 1-screw (2-hydroxy - 3, 5-dimethylphenyl) - 3, 5, and 5-trimethyl hexane 98g Phthalazine 9.2g Tribromomethyl phenylsulfone 12g 4-methyl phthalic acid Amount given [ a nucleating agent given in the 7g table 10 ] in Table 10 [0177] (Preparation of emulsion protective layer coating liquid B) To inert gelatin, the following class product was added and emulsion protective layer coating liquid was prepared.

Inert gelatin 10g Surfactant A 0.26g Surfactant B 0.09g Silica particle (mean particle diameter of 2.5 micrometers) 0.9g 1, 2-(bisvinyl sulfone acetamide) ethane 0.3g Water 64g [0178] in addition, LACSTAR 3307B -- the latex of a styrene-butadiene system copolymer -- it is -- the mean particle diameter of a particulate material -- 0.1-0.15 micrometers the equilibrium moisture content in 25-degree-C60%RH of a polymer -- 0.6wt(s)% it was .

[0179] (Preparation of back side coating liquid B) To polyvinyl alcohol, the following class product was added and back side coating liquid B was prepared.